

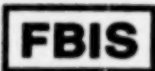
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17 September 1981

USSR Report

TRANSPORTATION

No. 55



FOREIGN BROADCAST INFORMATION SERVICE

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DESIGNER ANTONOV DISCUSSES AN-72

Moscow SOVIET EXPORT in English No 5, 1980 pp 28-31

[Interview with Oleg K. Antonov, designer, by SOVIET EXPORT science editor Vyacheslav E. Demidov: "A Large Plane for Small Airfields? AN-72, of course!"; date and place not given]

[Text]

S. E.: Our readers are used to regard your design bureau as an organisation working on turboprops. But this time you've come up with the An-72, powered by wing-top mounted turbofan engines. What's the reason for this departure from traditions and why the unconventional layout?

O. K. ANTONOV: Actually it would hardly be right to speak about a departure from traditions. Take, for example, our latest models – the An-28 passenger plane and the An-32 freighter: both are turboprops. You see, we put the emphasis on fuel economy, rather than speed, and that is an area where nothing can match the turboprop. The aircraft industry, internationally, shows increasing interest in turboprops: the propeller saves fuel, a product that is becoming increasingly expensive.

Now as to the An-72 layout, well, that naturally stems from the requirements the plane is supposed to meet. First of all, the need of short take-off and landing runs induced us to use the high-capacity and relatively light double-flow jet engines which are somewhere between turbojet and turboprop engines for their characteristics.

The wing-top mounted engine cuts short the take-off run. Here as the exhaust gases flow over the top airfoil surface the lift is boosted. Now when the flap is extended, the jet kind of sticks to it and deflects downward – you get a vertical component in the thrust vector, contributing to the greater lift. Sec-

ond, this aircraft is intended to operate from soft runways: so we have to make sure that the engine is not damaged by pebbles, sand or pieces of ice shooting out from under the wheels. In other words, we must move the engines up front and above ground as far as we can. In the An-72 the air intakes are practically abreast of the nose wheel, with about 4 m in minimum ground clearance.

S. E.: What else makes for the short take-off run and landing roll?

O. K. ANTONOV: The An-72 has very efficient high-lift devices: triple-slotted flaps on the wing panels and double-slotted flaps on the centre section, plus slats.

The short take-off run is also achieved thanks to the aircraft's high power/weight ratio. With a take-off weight of 26.5 tons and 13 tons in engine thrust the thrust/weight ratio is nearly 0.5 – a very good specification. With this thrust the aircraft quickly develops its take-off speed even on a slushy or snow-bound runway. If one engine fails during the take-off run, it is extended but the plane takes off anyway. So as you see, it meets all ICAO and FAO safety standards.

The short landing roll is due to the low approach speed, thrust reverser and powerful brakes. The reverser is of the bucket type, in which the jet is deflected forward and upward and the thrust vector backward and downward. The aircraft is thus pressed downward giving the brakes a better grip on the ground. Since the jet flows upward, no dust is raised and that permits you to keep the thrust reverser on until you come to a stop, and even to move tail first.

S. E.: You have mentioned take-off safety. I understand that you get heavy rolling and turning moments if an engine fails. The pilot should be able to cancel them out, right?

O. K. ANTONOV: The An-72 pilot remains in control of the plane even in this tight situation. Under the Soviet Airworthiness Standards (NLGS), the roll must not exceed 25° five seconds after engine failure. On the An-72 that figure is down to 15° maximum.

S. E.: How did you achieve that?

O. K. ANTONOV: We did it by, first, mounting the engines on the wing top and by moving them as close as was practicable to the aircraft centerline to minimize the moment caused by thrust asymmetry. Second, the An-72 carries an automatic levelling-off unit which actuates the interceptors of the failed-engine wing, without human interference, and reduces the roll.

S. E.: What's a two-section rudder?

O. K. ANTONOV: The two-section rudder is an important device for flight safety. Its fore section extends along the whole length of the fin and, at cruising speed, doesn't deflect. The pilot controls his aircraft, unassisted by boosters, by using just the lower half of the aft section. As soon as a thrust asymmetry develops or if the plane is manoeuvred jerkily, the first section is automatically actuated to cancel out the turning moment. The load on the controls as sensed by the pilot remains practically unaffected.

S. E.: Now the levelling-off unit and the two-section rudder, did these two features evolve through your testing or were they built into the design from the very beginning?

O. K. ANTONOV: Every new model is tested on a flight simulator as early as at the sketch design stage. You can feed into the simulator computer any data including the data of an aircraft that has never flown. The test pilot gets behind the control wheel and it becomes clear if the plane would be docile enough. The levelling-off unit, that we've patented, and the two-section rudder were built into the An-72 design and tested on such a simulator.

Because you have raised the question of design and testing let me make this point. When we were working on the An-24 design, the flight performance wind tunnel test took about 1,000 hours. The An-72 programme required 8,000 hours of aerodynamic testing. This was not because

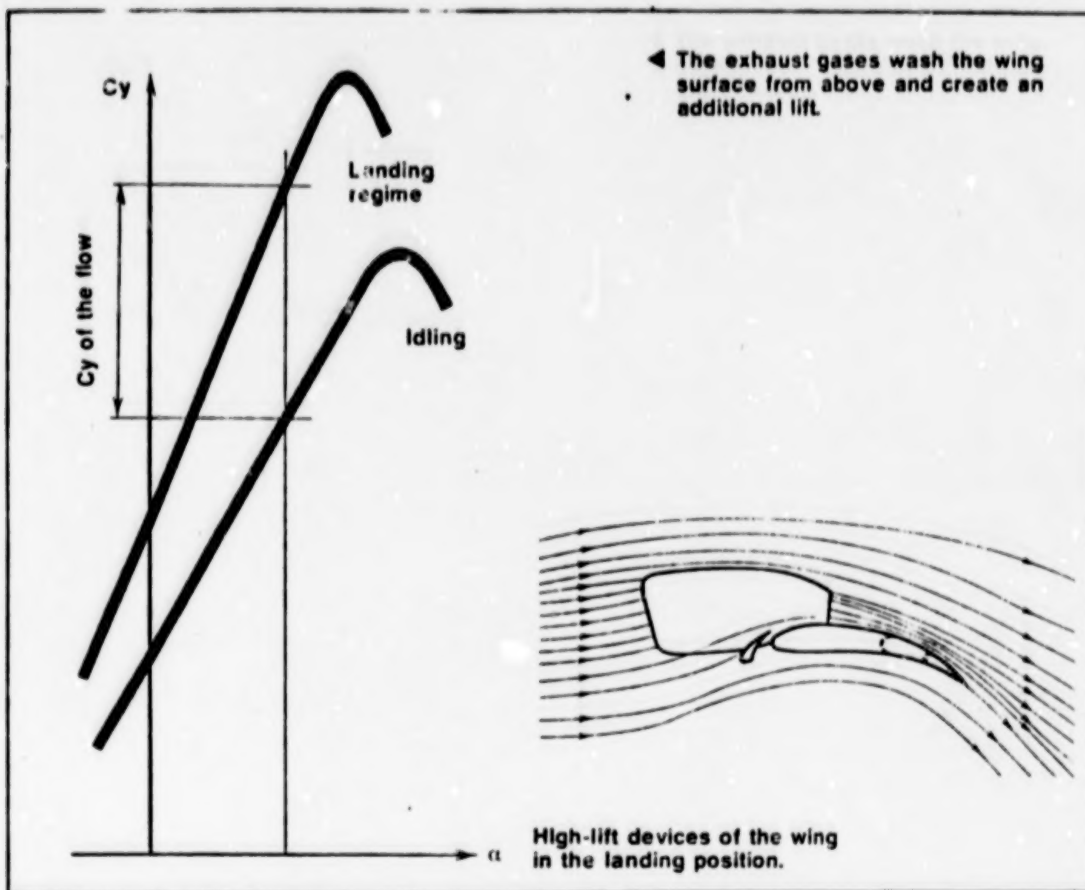
of any defects or failure but because there was a wider programme of tests. Besides, the new layout appeared to offer a wide range of intriguing new opportunities. As a case in point, we put the aircraft scale (1:2) model powered by scaled-down operational engines to a wing tunnel test. This gave us the aircraft performance over the entire thrust range – from idling to take-off. Hence, our confidence in the An-72 flight performance.

Again, even before it was actually built, we ran many structural tests – wing component joints, fuselage joints, etc. We had nearly 4,000 test units built and that number enabled us to make the right choice. All design features that had proved themselves on the An-24, An-26, An-30 and other An's were, of course, incorporated in the new aircraft.

S. E.: Impressive information! Now, the customer does not look for safety alone; he also wants his aircraft to be easy to service, right?

O. K. ANTONOV: Our design engineers always have that aspect in mind, too. As a result the airborne equipment on the An-72 is fully serviceable from inside the fuselage. You will remember that this aircraft is designed for small airfields which have no hangars – so we took care to protect the technical personnel from cold, rain and excessive sun.

The equipment is arranged along the side walls and covered with easily removable fibreglass panels. Each compartment involves just one particular system: you have an electric compartment, radio, hydraulics, piloting and navigating, instrumentation, etc. The technicians do not get in each other's way and everybody has easy access to his particular set of equipment. And that cuts down the servicing time – an essential condition for economical operation. There is an auxiliary power plant to maintain a controlled microclimate in the aircraft.



Incidentally, the airborne equipment is housed in a pressurised cabin which protects it against sharp pressure and temperature variations, and this is an important factor for improved reliability.

S. E.: What about the wing-mounted equipment, say, the engines? You cannot avoid going outside to service that.

O. K. ANTONOV: Of course not. However, the wing-mounted equipment requires servicing only at rare intervals and then, of course, you have to put the plane in a hangar.

As for the engines, all of their equipment is grouped below and affords easy access for servicing. A small ladder is standard airborne equipment.

Engine replacement has been made easier too. The An-72 engines are not suspended as in the conventional design but rest, instead, on girders. On top of the engine you have the eyebolt assembly: you just

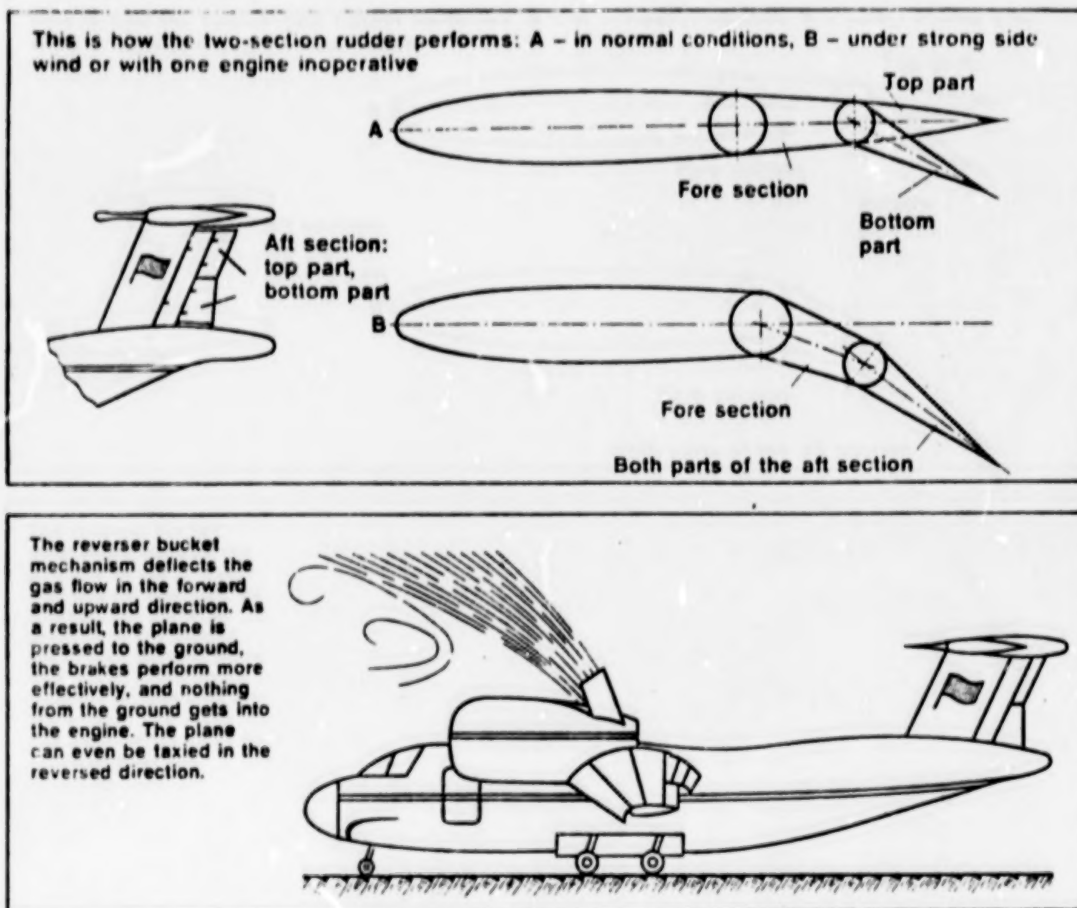
hook it up and lift off the engine complete with auxiliary units, cowls and air intake. You also put it back as an assembly, minimizing downtime all around.

S. E.: All right, the aircraft has been checked out, and it's time to take on the cargo. Well, the An-72 has the standard advantages of the rest of the An family – large hatch, freight ramp, roomy cabin, cargo hoist. But are there any additional advantages?

O. K. ANTONOV: If you are carrying fruit or some other perishable foods, the air conditioning system turns the cargo section into a refrigerator. Cargo is strapped down with light-weight band tackle. Handling is fully mechanised.

S. E.: Is there anything new in the flightdeck?

A Large Plane for Small Airfields



O. K. ANTONOV: We've done everything to take non-essential information off the pilot's mind and make flying easier. All instruments and panels other than those immediately related to navigation have been moved out of the pilot's field of vision, leaving in sight only what is known as the central warning light. It flashes to draw the pilot's attention to a particular indicator.

The automatic airborne computer performs the piloting from take-off to 30 m above ground in landing. The experience gained with aircraft so equipped indicates that en route the plane goes through the motions in the most efficient and optimal way, saving fuel and minimizing flight time.

The An-72 radio navigating and piloting equipment permits landings to be performed in ICAO Category II conditions (ICAO specification), that is with a 30 m cloud ceiling and a 400 m horizontal visibility range. Of course, the airfield has to be suitably equipped. Unequipped airstrips present different weather requirements, of course.

S. E.: How much testing has the An-72 seen on unpaved airfields?

O. K. ANTONOV: Soft strip testing began in the winter of 1978, and the An-72 has hardly seen any concrete strips since then - it's been nothing but snow and dirt, all around. So I can say confidently that no dirt can get into the landing gear well or the engines. You see there are many more small than large concrete-paved airfields, but air cargo has to be delivered everywhere. Also, experience proves that the farther you go, the more cargo you have to take there. Judging from the record, the An-72 will fare well on small airstrips.

Oleg K. Antonov was interviewed by Soviet Export science editor Vyacheslav E. Demidov.

[Photo Caption]

The new arrangement of the instruments relieving the pilot from information overloads was thoroughly checked on the flight simulator (above). All the instruments and panels not directly related to navigation have been moved out of the pilot's field of vision. The automatic airborne computer performs the piloting from take-off to landing. The wide-profile low-pressure tires ensure operation with full load from grass and snow-bound airfields (below).

AN-72 BASIC CHARACTERISTICS

Maximum take-off weight, kg:	
1,200 m airstrip	30,500
1,000 m airstrip	26,500
Maximum payload, kg	7,500
Maximum cruising speed, km/h	720
Optimal flight altitude, m	8,000 to 10,000
Service ceiling, m	11,000
Flying range (30 min fuel reserve), km	
with full payload	1,000
with full payload and fully fuel-loaded	3,200
Engines (Series, number and thrust, kgf)	D-36; 2x6,500
Service life, landings	30,000
Cargo cabin dimensions, m:	
length	9
cargo floor width	2.1
height	2.2
Take-off run, m	400 to 450
Landing roll, m	350 to 400
Speed, km/h:	
landing	165
take-off	180
Crew	2

CSO: 1812/76

AIR

'AEROFLOT' AUTOMATED SYSTEM TO BE DEMONSTRATED

Moscow VOZDUSHNYY TRANSPORT in Russian 18 Aug 81 p 2

[Article by V. Mikhnevich, supernumerary correspondent: "The Electronic Computer Never Sleeps"]

[Text] Once the only "computer" on board an aircraft was the pilot's brain. Today the electronic "brain" is there to help. The use of the electronic computer solves in a new way one of the key problems of present high-speed aviation--the problem of control. Automated control of air traffic is now on the agenda.

The exercise of control on an essentially different basis required a radical improvement of the most important link in the chain of control--communication. Much depends on the quality of work of communication in aviation. To this day, the radio channel continues to be the only thread connecting an airliner's crew with the ground. In recent years, specialists' efforts have been directed to the creation of communication systems capable of effectively operating under conditions of automated complexes. Today this problem is practically solved. Displays of the Soviet section of the Moscow International Specialized "Communication-81" Exhibit, opening in September of this year, will demonstrate the multipurpose "Aeroflot" automated system, developed in our country for civil aviation.

"This system," engineer Boris Semenovich Kuz'min states, "is meant to contribute to the solution of the chief problem facing pilots: to increase the throughput capacity of airports and air routes with guaranteed safety under conditions of high density of freight-passenger transportation. A characteristic feature of this equipment is that it makes it possible to maintain high-speed exchange of information between the crews of airships and land services automatically. The use of progressive methods of numerical coding in combination with microprocessors built into the radio equipment makes it possible to use on board a communications channel for automated transmission of data from various sources. Furthermore, it is possible to include, in addition to vocal information, telemetry in it without any special difficulty. This affords relief to the pilot and then makes it possible to provide the ground air traffic control service with information obtained directly on board the aircraft with the help of available technical equipment. Thus, data on the location of the

aircraft, speed and height of flight, supply of fuel in the fuel tanks, the weather situation on the route at that point where the aircraft is located and on the operation of the airborne equipment are transmitted. The exchange will be conducted in computer language. This is a first step toward a dialog between computers--a cherished dream of cyberneticists.

How will the obtained information be used on the ground?

We are quite accustomed to complaints about the weather service in connection with prediction of the weather. But is this always fair? In the final analysis, the possibilities of meteorologists are limited. Now it becomes possible to provide them with significant help. Data on the weather transmitted directly from hundreds of aircraft located in the air at the same time will not only provide with a high degree of accuracy the weather situation on routes but also predict its development with the aid of the computer. With the increase of air traffic density the forecasts will be more accurate.

We know how fatiguing it is for the pilot to constantly have to listen over the air and to catch from this dissonance of reports those addressed directly to the crew. Now this process is to be simplified. Each aircraft will be given its own code, and the processor on board will tune in on the communication signal only after it has analyzed the information and made certain that the latter has reached the proper address.

The example, finally, is at first glance paradoxical. Why should, after all, data be transmitted to the ground on the operation of airborne systems? Each aircraft has on board recorders, which register with great accuracy the operation of the equipment on board. The equipment itself is so constituted that in case of failure the reserve instantly goes into operation. But, looking into this, one finds reason for this. On landing the inoperative unit is obligatorily replaced, but this is an operation that requires time. Outlays can be significantly reduced if the proper services are alerted in advance while the plane is still in the air.

Nor will the passengers be forgotten. It will be possible from on board the aircraft to reserve by radio a room at a hotel, to send a telegram or to order a taxi.

"Aeroflot," in addition to equipment on board, will include automated land transmitting and receiving radio centers using remote control for operation from a single communications center. They will provide a reliable supply of information at one time to 40 airliners in the zone of the airport and to 300 on the route.

Such will be civil aviation's tomorrow.

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CSO: 1829/331

MOTOR VEHICLE

PROBLEMS IN OBTAINING ROAD BUILDING MACHINERY SPARE PARTS NOTED

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 5, 1981 pp 23-24

[Article by V. Lopatin, head of Mogilev Road Construction Trust, and A. Shemelev, candidate of technical sciences: "Spare Parts are Cheap, but Repairs Are Expensive"]

[Text] In recent years there have appeared on operational farms much high production machinery equipped with complex hydraulic, pneumatic, electrical systems working automatically or semiautomatically. There is no doubt that it has become easier to operate this modern equipment, but at the same time it requires more care. Naturally, extended idling of it while undergoing repairs or technical servicing exerts a negative effect on the economic indicator of the operating enterprise. This is especially so since a considerable number of machines, while working only a short period, remain idle for two-three, sometimes five to seven months because of individual parts and components being out of order and the latter not being able to be replaced shortly in most cases by reason of their lack at warehouses and bases. The most regrettable thing of this is the fact that frequently due to the absence of parts (seals, sealing rings and the like) costing only kopecks, equipment worth tens of thousands of rubles remains idle. It is frequently impossible to repair individual components that are particularly complex (such as, for example, hydraulic equipment) or to fabricate parts with one's efforts that have broken down in a repair shop because of complexity of design and the high requirements of precision. Moreover, production bases of operating farms for the most part lack the facilities for diagnostic tests, maintenance and repairs; this precludes the possibilities of a prognosis and consequently prevention of possible breakdowns. Plants that make the new equipment do not take effective steps to provide operating farms with necessary spare parts, units and components, diagnostic instruments and aids, technical services and repairs.

In our opinion, the production of equipment and ensuring its operating capacity should proceed in parallel, and the responsibility for the resolution of these questions should be identical. Then quite possibly there would disappear far from isolated instances where a new machine that has operated only a short time would remain idle for one reason or another for months or even years. Neither the manufacturing plant nor the planning and supply organization suffer any material losses from this. All the costs fall to the lot of the farms where the equipment remains idle. Here is a characteristic example.

Several years ago, the Kovrov Excavator Plant began to put out the high-efficiency EO-4121 excavator to replace the E-652B excavator with cable-block operation.

According to its technical-economic indicators, the new machine is markedly superior to the one before it. But the repair of components of the hydraulic system has not been organized. On working off a certain part of its operating life, the dual hydraulic pumps and distributors, for example, go out of order. It is impossible to repair them under operating conditions. There are no enterprises in the republic for the repair of such components. For this reason you will find representatives of farms traveling throughout the entire country in search of the necessary spare parts. As a rule, these trips are useless. The result is long downtime of the equipment. Just at the operating facilities of the BSSR Ministry of Construction and Utilization of Motor Roads, more than 10 EO-4121 excavators remained unused practically the entire last year because of malfunctioning of the hydraulic distributors.

Lack of spare parts also was responsible for the "lay off" of a large number of KamAZ motor vehicles, DZ-31 bulldozers, T-180 tractors, TO-18 loaders and other machines. The situation is particularly unfavorable in regard to the maintenance of imported equipment. The replacement of broken down parts and components and the fabrication or obtaining of such new items is an almost unsolvable problem.

The result is a paradox: the country puts out tremendous funds, materials and labor to accelerate the development of new equipment; at the same time, a large number of machines, no less than a year's output (if you are to judge by the BSSR Ministry of Construction and Utilization of Motor Roads) have been standing idle for the second or third year due to the lack of this or that part, which is a hundred, even a thousand times cheaper than the machine itself!

What is the way out of such a situation? Does any exist? In our view, there is a solution. But let us note that the problem of providing machines with spare parts and the necessary equipment for conducting diagnostic tests, maintenance and repairs is complex, it cannot be solved in one piece. An all-round, scientifically based approach is required.

First, it is necessary to radically revise the system of planning, production and supply of spare parts. At the same time, there must be taken into account the regime and conditions of operation of the machines, factors of reliability, durability, repair capability and economic feasibility. The existing system of determining the spare parts list leaves many of them out. In order specifications and products list books no account is taken of the operating time of equipment nor of the conditions and regime of operation. For a number of machines, order forms include parts, components and units that operate reliably to the time of their being written off or those whose repair and restoration not only present no difficulties but are economically feasible under operational conditions. Consequently, warehouses of supply and selling bases accumulate a large quantity of spare parts that are not in demand; these are subsequently issued as a compensation for deficit parts, and operating facilities write them off for scrap metal... At the same time, a number of needed parts, components and units are not included in specifications and are not provided for the user.

Neither the supplying plant nor the using organizations possess reliable data on the durability of structural elements of this or that machine. Consequently, users cannot order needed spare parts and the supplying enterprise does not know what to produce, since it lacks such information.

Second, it is essential to raise the interest and accountability of the fabricating plant for the production of needed spare parts and the operation of a machine for the entire period of its operation--up to the time that it is written off. It possibly makes sense to increase the production of spare parts even at the expense of reducing the output of new machines. The fact is that because of nonoperation of equipment tremendous funds are frozen.

The procedure of distribution of spare parts is in need of radical revision. The present system of their deliveries from fabricating plants to the user via numerous warehouses and bases is cumbersome and inconvenient. At the warehouses of different ministries and departments, spare parts costing large sums are concentrated simultaneously; these frequently exceed the norm. One may contain some of them, another others (whatever they have been able to acquire). It happens that machines remain idle at some organizations because of the lack of parts which lie in reserve at the warehouses of other organization and vice versa. A search system is not to be found even within a single ministry. Therefore, not only suppliers, but sometimes even the heads of facilities personally take part in the search for and exchange of spare parts. It is no secret that it is frequently done not in state interests...

An acceptable solution is to be found in the creation of centralized warehouses (bases) according to groups of machines and territorial zones for all users (regardless of departmental affiliation). What is better would be to create centralized warehouses and bases according to groups of machines or specialized centers for maintenance and repairs or to solve each concrete case on an individual basis while taking into consideration a number of factors. There is no doubt about one thing: work will benefit from this.

Another significantly important problem is capital repairs of machines. The isolation of repair enterprises, which are subordinated to various departments, does not permit the organization of repairs on an industrial basis, performed with quality in short periods of time. This especially applies to construction and road, municipal and land reclamation equipment. Practically every republic ministry has its own small repair plant. The list of machines repaired there is very large, the quality of repairs is low and the time required exceeds by a factor of 2 or 3 or higher. After leaving such a "plant," a machine frequently has its repair work "completed" at the enterprise's repair shop. Often it does not complete half of the normative operating time and, if it is not written off, it is again sent for routine repairs. The enterprises owning the machines have expenditures in this regard.

The solution appears to be in narrow specialization of repair enterprises (regardless of departmental subordination) by types of machines and conversion to the unit-component method of repairs at facilities. With this aim in mind, it would be advisable to create in place of a large number of tiny plants several enterprises for the production and repair of certain kinds of components and units, the need for which should be determined on the basis of research and practical estimates for each group of machines. It would be better to concentrate the components and units at central warehouses by zones and allocate them according to the needs of the utilizing facilities.

It would probably also make sense to set up repairing of individual units in different organizations according to the territorial principle. For example, it would be possible to concentrate in some trust the repair of engines, first providing it with

the necessary equipment and turning over to it funds for the appropriate spare parts. Another trust could assume the responsibility of repairing bridges, a third--gear boxes and so on. It would even be better to organize such repair work at the level of different ministries.

In order specifications and products-list books, it would be advantageous to indicate the service life of parts and components under different conditions and regimes of use. For this reason plants, sectorial scientific-research institutes and educational institutes should be required to determine the numerical values of the operating time of individual elements of a design. By knowing the number of machines being used and their conditions of operation, it would be possible to order the necessary list of spare parts and also to plan their production.

The rapid solution of the enumerated problems would require the participation of planning and supply organizations, fabricating enterprises, scientific-research institutes and also utilizing enterprises. If today losses in the republic amount to millions of rubles from idling of equipment, tomorrow they could be manyfold larger.

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CSO: 1829/333

MOTOR VEHICLE

GEORGIAN HIGHWAY TUNNEL EXCAVATION COMPLETED

Tbilisi KOMUNISTI in Georgian 1 May 81 p 2

[Article by Tbiltonnel'sstroy Tunnel Detachment No 9 Chief and USSR State Prize Winner G. Dzhakeli: "Light in the Tunnel. The Collective of Tbiltonnel'sstroy Tunnel Detachment No 9 Has Completed Digging the 1722-Meter Highway Tunnel Through Rikoti Pass"]

[Text] In the winter season, Rikoti Pass caused difficulties for men and vehicles. It hampered the hauling of economically essential freight at an elevation of 997 meters above sea level. The situation persisted for years, until finally it came time to decide the matter of rebuilding the highway from Khashuri to Kutaisi, which would necessitate digging a 1722-meter tunnel at kilometers 122-124 through Rikoti Pass.

At the request of the GSSR Highway Ministry, the Kavkaztransproyekt Institute's Bridges and Tunnels Department (P. Bochikashvili, Chief) drew up a plan for the project. The job was assigned to the collective of Tbiltonnel'sstroy Tunnel Detachment No 9. We began to tunnel from the eastern and western portals.

The work proceeded under exceptionally difficult geological conditions. We were confronted by rust-colored creeping granite clayey rock. The firmly installed metal support rings couldn't withstand the pressure, and progress was halted sometimes for months on end.

Nevertheless, the collective did not flinch, and even achieved remarkable successes. And this year's labor watch ended with man's triumph in the long, exhausting battle with the treacherous rock under the earth's surface: the two groups met at 12 noon on 29 April.

And so it was that the 1722-meter tunnel was completed. It marked a big breakthrough in the construction of the highway. No more obstacles face us now. We can now successfully continue work on the lower part of the tunnel, about one-third of which is already completed.

The meeting of the groups of the eastern and western portals was an event of rejoicing. It was truly a triumphant celebration, a real labor victory.

Surveyors Z. Garsevanishvili, T. Gongadze, and Z. Tabatadze--real "pilots" of underground operations--congratulated the collective. Their vertical and horizontal calculations turned out to be extremely accurate.

Members of A. Chapichadze's and I. Gachechiladze's crews embraced each other fraternally. To them fell the honor of carrying the collective's prime task to completion. Also in attendance were the other crew chiefs, R. Gibradze, S. Kharaishvili, D. Tsitsilashvili, K. Gasimov, T. Glurdzhidze, and R. Kupatadze. Our collective is justly proud of our engineers, who are so gifted with organizational talent and skills. The unit's chief engineer, M. Datebov, was able to handle all problems in the project.

From the eastern portal the digging was supervised by Engineer O. Kupatadze, from the west--Engineer N. Zukhbaia. I want to make special mention of the contribution made by the leading shift chiefs. Praise is due to Kh. Tsaava, G. Samkharadze, Dzh. Arabidze, and G. Kakhiashvili, machinists M. Gogia, Sh. Grdzlishvili, and D. Gongadze, blasters T. Tedeyev and Sh. Buchidze, electric welder A. Yedlichko, leading mechanics and electricians G. Daudishvili, A. Dzhikhvanshili, and others.

There is still a lot of work to be done. We have to dig out a rather big section of the tunnel's lower portion.

We are attaching great importance to the construction of the portals and installation of the ventilation equipment. The ventilation structures (both east and west) are three stories in height and very original and refined in form. The ventilation conduit is installed in the ceiling and sealed with a special material the whole length of the tunnel. The ventilation system is extremely effective. It consists of two basic structures. The compressed air mass is sucked in by the one unit and blown out by the other. This will enable us to expel harmful vehicle exhausts constantly from the tunnel.

The tunnel will have high traffic capacity, with two-way traffic. Vehicles of any and all sizes are accommodated.

The collective has a sense of high responsibility for the work that remains to be done. We are ready to do our utmost to carry out the installation and complete this essential project next year.

6854

CSO: 1813/080

MOTOR VEHICLE

BRIEFS

SWITCH TO FRONT-WHEEL DRIVE--The Soviet Union intends to start the production of front-wheel drive automobiles, announced Deputy Minister of the Motor Vehicle Industry Valentin Kolomnikov in Moscow. Passenger cars will become roomier since there will no longer be a need for the cardan housing and shaft, stated the minister. However, the most important factor is that front-wheel drive autos are more stable, it was added. The Soviet Union has not previously officially confirmed information that older production models will be replaced by the more modern front-wheel drive models. However, in April 1980 the West German Porsche Plant confirmed that it is developing a front-wheel drive Lada car, which would be ready for production at the large Tolgliatti Plant in 1983. No precise information was available in Moscow with respect to the commencement of production. The Tolgliatti Plant has been manufacturing the Italian Fiat based Lada for 10 years. The production of new models would mean a reduction in the production of the older models, since a representative of the Avtoeksport Association, which is responsible for auto exports, stated earlier this year that the production of passenger cars will remain at the current level. [Text] [Helsinki UUSI SUOMI in Finnish 22 Jul 81 p 9] 10576

CSO: 3107/123

RAILROAD

LONG-RANGE GEORGIAN RAILROAD NETWORK CONSTRUCTION URGED

Tbilisi KOMUNISTI in Georgian 9 May 81 p 2

[Article by Professor Dr of Economics Al. Kuchukhidze, head of Tbilisi State University's Department of Economics and Organization of Non-Industrial Enterprises, under rubric "Suggestions, Opinions": "Georgia's Railways Tomorrow"]

[Text] In the past 60 years, positive advances have been made in Georgia's transport development. Georgia has become a republic with a relatively strong and unified railway system. It is of paramount social-economic and political-strategic importance for Georgia to draw up a long-range integrated program of transport development.

It is with regard to this problem--the formulation of a long-range integrated program of transport development--that we wish to express a few opinions, primarily with regard to long-range railway transport. As V. I. Lenin teaches us, "the railroads are the main, the most prominent manifestation of the link between the city and the countryside, between industry and agriculture, upon which socialism as a whole is based."

This is why in the past 60 years, both in the USSR as a whole and in Georgia, prime attention has been focused on the development of rail transport along with maritime, airline, automotive, and pipeline transport. In that time, the operational length of rail transport in Georgia has about doubled, passenger transport has grown by six times, and freight haulage has increased by more than 16 times. Even now, enormous amounts of work are being done to expand the carrying capacity of Georgia's rail network. On the main lines, second tracks are being laid at a rapid pace and key stations are being expanded and rebuilt. The Marabda-Akhalkalaki Line is under construction along with a number of other vital measures. But Georgia's industry, agriculture, and other sectors are growing so fast and on such a scale that unless more main lines are built, it will be much more difficult in the future to satisfy the economy's and the people's requirements with regard to inter-republic and in-republic freight haulage and passenger transport.

At the 26th GCP Congress, CPSU CC Politburo Candidate and GCP CC First Secretary E. A. Shevardnadze justifiably commented on the necessity of resolving such vital problems as the construction of the Caucasus Pass Line and sidings in Tbilisi.

As we know, Georgia (and Transcaucasia generally) does not have a direct rail connection to the North Caucasus. As a result, a substantial portion of the freight hauled into and out of Georgia and Armenia has to go by Derbent and Baku. The Black Sea Coastal Line is chiefly for passenger transport. The new Caucasus Pass Line will link Georgia and Transcaucasia more closely to the RSFSR and the other fraternal republics, shorten overland transport distances by from two to five times, relieve the freight load on the heavily traveled Tbilisi-Samtredia-Sochi and Tbilisi-Baku-Derbent lines, and substantially reduce the cost of transport in the economy.

Unquestionably, therefore, the construction of the Caucasus Pass Line is essential. It is to be considered one of the most vital efforts in the program to develop Georgia's transport system. Nevertheless, in our opinion, we cannot afford to focus solely on the construction of this particular rail line in drawing up a long-range program of transport development. The density of our republic's rail lines, our natural resources, our geographical position, and the pace of our industrial development all testify that we must take steps now to have plans and calculations for the construction of all the rail lines which will be essential not only in the next 20 years but in the longer term as well. Such an approach will help us avoid errors and create conditions favoring accurate determination of the optimal periods for the construction of the particular rail lines, enabling us to utilize the capital allocated for railway construction more effectively and without loss of time.

It is true that the construction of the Marabda-Akhalkalaki Line, which is now under way, is entirely justified in economic and social terms as well as being very timely. At the same time, in our opinion, in order to make better use of the natural resources of Georgia's southern mountain areas and better satisfy the freight haulage and passenger transport needs of the zone's population and economy, it will be advisable in the future to extend the line from Akhalkalaki through Aspindza to Akhaltsikhe, and later on through Adigeni, Khulo, Shuakhevi, Keda, and Khelvachauri clear to Batumi. Construction of the Akhalkalaki-Akhaltsike and Akhaltsikhe-Batumi rail lines will further enhance the importance of the Marabda-Akhalkalaki Line now under construction. A Marneuli-Akhaltsikhe-Batumi Mainline will come into being, and then the most important part of Eastern Georgia, as well as Armenia and Azerbaijan, will (after Marneuli is connected to Rustavi by rail) be linked to the Black Sea coastal rayons, bypassing the heavily overloaded Tbilisi rail center and the Tbilisi-Samtredia-Batumi Mainline.

In our opinion, the question of planning and construction of a railroad between Tsnori, Lagodekhi, and Zakataly should be placed on the agenda of the longer-range future if not in the present program itself. Long ago, before Soviet power was established in Georgia, it was felt that Georgia ought to be linked to Azerbaijan by a second rail line. In fact, a plan was partially drawn up at the time to link Tsnori with Azerbaijan by a rail line across the Alazani Valley

Tsnori, Lagodekhi, and other nearby towns in Kakheti--like Belokany, Zakataly, Kakhi, Mukha, and adjacent territories in Azerbaijan--are densely populated. This area, which has rather good prospects for industrial and agricultural

development, is only weakly developed because of inadequate transport connections. Construction of a Tsnori-Lagodekhi-Zakataly rail line would strengthen economic ties between the two fraternal republics.

In order to improve in-republic rail transport, it will be necessary to connect the central portions of the present Tbilisi-Samtredia Mainline and our proposed Marabda-Akhaltzikhe-Batumi Mainline by building a line between Akhaltzikhe and the Rioni. In our opinion, such a line should link Akhaltzikhe with Rioni by way of Abastumani, Sairme, and Mayakovski. The Akhaltzikhe-Rioni Railroad would provide the shortest link between the microrayons of the Marneuli-Akhaltzikhe-Batumi line and our republic's second industrial center--Kutaisi and Imereti generally.

In order to improve the present Vesyolaya-Sukhumi-Tskhakaia-Samtredia-Batumi rail line, as well as to speed up and reduce the cost of carrying freight and passengers on this route from the microrayons of the Vesyolaya-Kheta line and from the RSFSR, also from Poti to Batumi and back, it seems to us advisable to build rail lines from Kheta to Poti and from Poti to Supsa. The Kheta-Poti and Poti-Supsa lines would link the three Black Sea coastal cities Sukhumi, Batumi, and Poti while bypassing the Tskhakaia and Samtredia rail centers. The construction of these "linking lines" would substantially shorten the rail distance between Abkhazia and Adzharia. This would also eliminate strictly local freight operations and relieve the Tskhakaia and Samtredia rail centers of excessive train traffic and shunting operations.

Further growth and development of industry and agriculture in the mountain rayons of Racha-Lechkhumi and Mingrelia, the mining and processing of abundant mineral resources there, mineral water exploitation and resort development--all are hampered even now by inadequate transport.

The fine prospects for Kakheti, Kartli, South Ossetia, and other areas of the republic lead us to think that in order to strengthen our republic's internal transport links, after the above measures are completed it would be economically and socially advisable to build another east-west rail line, bypassing the Tbilisi center, to serve Akhmeta, Tianeti, Dusheti, and Leningori rayons. Such a line would link Telavi to Gori via Telavi, Akhmeta, Tianeti, Dusheti, and Leningori.

Of course, the creation of such a railway network in Georgia will take many decades, but in order to resolve these long-range problems in accordance with the laws governing systematic, proportional development of the economy, we must start now. It is one of the most important and essential conditions for the further flourishing of Georgia's economy and culture, for encouraging the population of the mountain zones and the countryside generally to stay where they are, for wiping out the differences between city and village, and for equalizing levels of economic development from region to region and rayon to rayon.

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C30: 1813/081

OCEAN AND RIVER

EFFORTS CITED TO REDUCE MARITIME SHIPPING COSTS

Baku BAKINSKIY RABOCHIY in Russian 8 Jul 81 p 2

[Interview with T. B. Guzhenko, USSR minister of maritime fleet, and Chingiz Shamilevich Ismaylov, secretary of the party committee of the Caspian Shipping Company, by TASS and BAKINSKIY RABOCHIY correspondents: "Collaboration Among Related Activities"; date and place not specified]

[Excerpt] "The Amur motor vessel 'Zhiguli' opened up service on the Blagoveshchensk--Khabarovsk--Sakhalin line 10 days earlier than usual." "Workers in the port of Baku have since the beginning of the year handled more than 50,000 tons of cargo over and above the plan...." More and more such radiograms are being sent from ocean latitudes and the country's riverways and communications from ports and shipping companies. These are not only traditional reports on operations for the first half of the year. The success achieved from the first days of the navigation season are a pledge to fulfillment of the assignments of the 5-year period as a whole. And the assignments confronting watermen are by no means easy ones. "In view of the seriousness and scale of the problems that have accumulated in transportation," Comrade L. I. Brezhnev said at the 26th party congress, "we have come to the conclusion that they can be solved only on the basis of a long-range comprehensive program. The drafting of such a program has been provided for in the Basic Directions..." TASS and BAKINSKIY RABOCHIY correspondents called upon T. B. Guzhenko, USSR minister of maritime fleet, and Ch. Sh. Ismaylov, secretary of the party committee of the Caspian Shipping Company, to talk about the strategies for carrying out that program.

[Question] Reduction of shipping costs was referred to at the congress as a statewide task. How does the maritime shipping industry intend to achieve this?

[Answer] This is an extremely important problem (said T. B. Guzhenko). It used to be said: "A heifer for a half-penny overseas, but the shipping cost is high." Today this sounds naive, but it correctly expresses the essence of the matter. It is not inexpensive to deliver freight over thousands of kilometers on vessels

which themselves are complicated and expensive pieces of equipment and to unload them with complicated machinery, and this considerably increases the cost of the commodity. Reduction of shipping costs depends on the efforts of shiphandlers and port personnel and on their creative attitude toward their work.

Principal attention is being concentrated in the new 5-year period on raising the efficiency of utilization of what was created in the past, since capital investments cannot be endless and since labor resources are also subject to limits. Those figures, for example, indicate how much efficiency needs to be raised: By the end of 1985 the fleet will grow by approximately 4 percent, but the volume of foreign cargo traffic it carries by 35-40 percent.

In the current 5-year period the growth rates of tonnage are dropping, though as in the past the composition of the fleet will improve. In recent years the maritime fleet has been replenished with container carriers, ro-ro vessels, LASH vessels, and other specialized cargo vessels whose principal value does not lie in the number of tons they take on board, but in their design, which makes it possible to quickly process the vessel in port. I will illustrate this with the example of two motor vessels--a general-purpose vessel with a carrying capacity of 10,000 tons and a ro-ro vessel with a capacity of "only" 3,000 tons. Over 1 year on the same route 95,000 tons can be carried on the first vessel and 125 on the second. But that is not all. The traffic capacity of the dock increases by 220,000 tons when ro-ro vessels are processed, and indeed it is considerably simpler and cheaper to build the dock itself for that vessel, since no specialized equipment is needed.

[Question] The decisions of the congress call for improving the coordination of effort among all the branches of transportation. What is already being done in that direction?

[Answer] The most effective form of coordination of the efforts of transportation workers is now the interlinked planning of the operation of related activities within the transportation junction. Adoption of the unified continuous schedule-plan of the transportation junction, which began on the initiative of the Leningrad people and was acclaimed by the CPSU Central Committee, is becoming more and more widespread. This know-how has already been adopted on the basis of the seaports in 38 of the country's transportation junctions. The most substantial results have been achieved by the initiators.

Switching a portion of freight from rail to river and highway transportation has made it possible for the railroads to carry an additional 1.5 million tons of freight. A convincing result of cooperation within a junction is completion by the Baltic Shipping Company of its assignments for the 10th Five-Year Plan as early as August. Comrade L. I. Brezhnev expressed high praise of this achievement in his greetings.

The breaking down of departmental barriers is a requirement of the time. Contacts between related activities should and can become closer and become collaboration among collectives which is based not only on the common interests they have in their production, but also on purely human communication. Many

collectives have long been working together and know each other well. For example, the dockworkers of the Astrakhan' riverport and the Baku seaport have been competing with one another for more than 15 years. And rivals in work effort as a rule become friends, willingly reveal secrets to one another, the aim being to achieve the highest indicators in their performance....

[Question] The minister has highly praised the collaboration of transport workers of Baku and Astrakhan' in their labor efforts. What can you add to what he has said, Chingiz Shamilevich?

[Answer] That cooperation (said Ch. Sh. Ismaylov) has indeed been of tremendous benefit for many years now. And if we are to speak in broader terms, I would say that the party organization and management of our shipping company have been paying much attention to the problems of making socialist competition more effective. The results are regularly analyzed, and they are published as widely as possible. Constructive know-how is quickly spread to related vessels and ports.

The results of the first half of the year have now been totaled up. And the results, we must say, are good: The shipping company fulfilled the plan for cargo traffic in coasting by 28 June and in international navigation by 25 June, carrying moreover an additional traffic exceeding 150,000 tons of cargo. The crews of the vessels "Kafur Mamedov," "Nakhichevan," "Gazli," "Sovetskiy Azerbaijan," "Bagermeyster Aliyev" and others were first in the labor rivalry. The collectives of the port of Baku and the administration Kaspomorput' have been running ahead of their targets. The sailors on the tanker "General Aslanov" and the crews of the motor vessels "Poet Sabir" and "Kemine," who completed ahead of schedule the program of the 10th Five-Year Plan for cargo traffic, hold the baton of the labor accomplishments of the older generations firmly in their hands.

7045

CSO: 1829/315

OCEAN AND RIVER

RIVER TRANSPORT PERFORMANCE INDICATORS EXAMINED

Moscow VODNYI TRANSPORT in Russian 4 Aug 81 p 2

[Article by V. Nikolayev, engineer: "How To Assess the Fleet's Performance?"]

[Text] The Basic Directions of the Economic and Social Development ... of the country's economy, adopted by the 26th party congress, state: "To introduce at all levels of management of the economy more refined planning indicators which are differentiated so as to take into account the specific character of sectors and industries and which reflect most fully and stimulate a growth of output, a rise of production efficiency and higher labor productivity...." This instruction makes it incumbent upon rivermen to look critically upon the qualitative indicators of the performance of the fleet and ports now in effect in the industry. On the basis of the results of activity, these indicators have many defects and are holding back further development of traffic.

The planning and management of the transport process has become more complicated as the material and technical base of the river fleet has been bolstered and as traffic has increased. The old methods are no longer yielding the anticipated results in development of traffic and in the utilization of vessels. Breaches of the shipping process have become more frequent, the idle time of the fleet has increased, and the growth rates of its productivity have dropped.

Scientific research and academic institutes have regularly conducted and are now conducting explorations for improved indicators, but they have not achieved notable success: their proposals have not been applied in practice. At the present time the system of indicators of the various elements of the performance of the cargo fleet, both self-propelled and nonself-propelled, includes three groups of the most important elements: the load per unit distance in tons per ton of carrying capacity, the average daily technical [between stops] speed of loaded vessels, and the coefficient of utilization of loaded running time.

The product of the load per unit distance, the technical loaded speed and the coefficient of utilization of loaded running time determines the composite indicator of gross output per ton in ton-kilometers per day of the operating period.

While the present function in determining the indicator is regarded as legitimate and correct, it must be said that it inaccurately reflects the technological nature of the transport process. The indicators that exist do not duly reflect the acceleration of technical progress in the fleet and in ports, nor do they improve the transport process or increase the efficiency of the transport effort.

The proposals of certain authors to improve the present system of evaluations come down to preserving the fleet's productivity as the principal indicator, but it is broken down into its basic elements and presented in a somewhat different form. The indicators of the load and the loaded speed, moreover, remain unchanged. The distance traveled by the loaded vessel is replaced by the distance traveled by the cargo within the jurisdiction of the shipping company. Lockage time (available tonnage-days divided by tonnage-traveling time) is being replaced by the ratio of tonnage-days to tonnage-kilometers traveled by loaded vessels.

Time spent during loading operations and waiting for them is represented differently. The proposals contain no new indicators. Productivity in ton-kilometers thus remains the principal indicator, and dividing the indicator up into its components does not change the nature of the thing and complicates the computations. The new "little pieces" of the productivity indicator--average hauling distance within the jurisdiction of the shipping company, the ratio of lockage days to tonnage-kilometers traveled by loaded vessels and certain other elements--have been well known for many years and are extensively used in practice for purposes of analysis.

In the mid-sixties essential defects were permitted in the planning of the elements of the gross unit of measurement. A group of scientists has presented a proposal which essentially consists of totaling up the recurrent idle time of vessels in ports waiting for loading operations (and for other reasons) and referring to it as "port time during technological operations." The standard allowances for this kind of time is to be determined by computation rather than from statistical reporting. But since it is technically difficult to do this because a method has not been worked out, in the ports they have begun to use the statistical data of past years in general form, without breaking them down into elements, instead of a computational method.

Thus "port time during technological operations" of vessels in ports has begun to bring together all categories of idle time, in addition to loading operations. This eliminated the need for computational substantiation of standards governing technological operations by element. The absence of a detailed reflection of the turnaround time of vessels could not have a beneficial effect on the processing of the fleet in ports. The responsibility of the operations subdivisions of ministries and shipping companies in the transportation process was diminished. The result of this is that port time during technological operations has risen nearly 5 percent since 1965 for diesel cargo vessels.

To improve the performance indicators of the fleet and ports it is important to study and summarize the port time of vessels actually achieved by progressive collectives, to work out a method of calculating standard allowances for port

time during operations. It is mandatory to establish the responsibility of the particular administrations and divisions of the ministry, shipping companies and ports for fulfillment of the qualitative indicators in performance of the transportation process. And, finally, further study is needed on the idle time of self-propelled and nonself-propelled vessels during loading operations and of port time during technological operations.

In recent years river transportation has received efficient machines to intensify cargo handling. Against that background it seems strange that the intensity of processing the fleet in ports should be slow to rise.

In our view the gross output per ton of tonnage should not be ignored as a computational standard of measurement. Its most important qualitative indicators--the load per unit distance in tons per ton of carrying capacity, the technical speed of loaded vessels, and the coefficient relating loaded running time to total time--should be left unchanged and should not take into account all possible influences and functional relationships.

Turnaround time should be determined by computation on the basis of time achieved by progressive collectives.

It is quite clear that using any system whatsoever for determining the expenditures of time for whatever operations one pleases in ports will not automatically increase the fleet's efficiency and reduce its idle time. Moreover, all the elements of the time of cargo vessels are based on statistical reports and reflect only the status of the vessel, and not the reasons for the idleness. There is a need for purposive activity by ports and shipping companies to eliminate the real causes of idle time and to improve the quality of indicators.

No evaluations of productivity, whatever form they might take, alter the nature of the complications, but they often make the computations and their use more difficult. Incorporation into the system of calculations of the qualitative indicators of the standards actually achieved by progressive collectives of vessels and ports makes it possible to improve the quality and efficiency of the shipping process.

A large share of the fixed capital of river transport is made up of port facilities, whose principal function is to speed up the processing of the fleet and its turnaround time. But the system of indicators directed to that goal is not yielding notable results. The processing of the fleet is hardly reflected at all in the performance indicators. Conditions have been created which orient the ports in their activity toward fulfillment of economic and financial indicators by virtue of nontransport operations: the leasing of warehouse space, vessels and cranes, and the movement of cargo within the port. The profitability of these operations is considerably higher than from servicing the fleet. Often, then, the profitability target is fulfilled to the detriment of the shipping process.

Proposals are being made for adoption of the indicator of intensification of cargo-handling operations, reflected in tons per tonnage-day in order to increase

the efficiency of cargo handling in ports. But given the present machinery which the ports have, this will orient them toward processing small vessels first. Increasing the rate of servicing of large vessels requires that the productivity of cargo-handling operations in the processing of vessels that differ in their carrying capacity be made proportional to their capacity. Changes in time expenditures are not the same for the port (when there is an increase or decrease in cargo handling) as for the fleet (when there is a change in its carrying capacity). So the question of justifying the level of productivity of cargo-handling machines in the process of intensification is in need of further study.

One large shortcoming in the operation of river transport is the lack of efficient and smooth rhythm in the movement of vessels. That is actually why the indicators of employment of the fleet and ports are not rising. In the opinion of operating personnel, the need has arisen to create in traffic departments special economic analysis groups which would be capable of evaluating the shipping process. This question deserves the most steady attention.

The lack of a uniform pace in movement of the fleet, the tendency for vessels to arrive at berths in bunches, puts the operation of the ports in a difficult position. That is why more than one-fourth of all vessels take more than the allowed time to be processed.

One of the principal methods of improving the operation of the river fleet at the present time is adoption of a new and more progressive form of management of the transportation process on the basis of a system of interconnector, continuing planning operations. But the organizational structure that now exists in the river fleet cannot be fully harmonized with overall smooth operation of the transportation conveyor.

The fragmented nature of management of the network of waterways stands in the way of strengthening interregional economic relations and does not afford the possibility of developing through shipment of volume cargo, though it is in that kind of traffic that river transport has its highest efficiency. The present disconnectedness does not correspond to the organizational structure of the other branches of transportation--rail and maritime, it makes relations more complicated between river shipping companies and the railroads which are supposed to carry freight in direct combined rail-water shipment.

Finally, it becomes more difficult to distribute the traffic optimally, which is done jointly by the union transport ministries and departments. Adoption of the new system for management of transportation should become the focus of attention in organizing operations.

It is generally recognized that ton-kilometers do not represent transportation's output. They are only indicators of the physical volume of operation of the moving equipment, in this case the fleet. At present the ton-kilometer is indispensable as a computational indicator in determining transportation resources. But its use as a performance indicator is not only inadvisable, but even economically incorrect. Consequently, we need another indicator here.

A sensible proposal on this issue is to evaluate the operation of river transportation on the basis of tons delivered. Since replacement of ton-kilometers by tons delivered is applicable to determination of the final result of effort and does not reflect the necessary expenditures incorporated in the shipping cost, it is equally important that revenue from operations be regarded as an equally important performance indicator. It is also indispensable to incorporate into that indicator such elements of efficiency as the delivery cost and labor productivity in delivering the freight to consumers, without which the transportation process cannot take place.

There are grounds for supposing that solving the problems we have touched on here will bring about improved quality and higher efficiency in the carrying of cargo by river transport.

7045

CSO: 1829/315

OCEAN AND RIVER

OPTIMUM DIAGRAM FOR FUEL PREPARATION

Moscow RECHNOY TRANSPORT in Russian No 6, Jun 81 pp 28-30

[Article by Doctors of Technical Sciences V. Selivestrov and B. Vasil'yev of the Leningrad Institute of Water Transport]

[Excerpts] It is necessary for oil consumers to prepare themselves for the transition to new types of fuel: hydrogen, synthetic and liquified coal fuels, etc. For the immediate future, however, oil will remain the basic fuel for our river fleet. Therefore, taking into consideration our limited reserves of oil, the shortage and high cost of diesel fuel, we must observe a fuel economy regimen and, in the shortest time possible, facilitate the transition of ship diesel engines to motor and other heavy types of fuel.

An analysis of fuel resources shows that, whereas in 1979 the availability of diesel fuel in the USSR exceeded its use, in the future--by about 1990--the national economy's need for distilled fuel will not be met despite a certain increase in production, inasmuch as oil will be utilized to an ever greater degree as raw material for the petrochemical industry.

We intend to implement a number of measures in order to cut back on this impending shortage: expansion of oil diesel fuel distillation facilities; use of hydrogen, gas and alcohol, coal-processing products, and other types of fuel in diesel engines; shifting over all of our intermediate H.P. diesel engines to the use of motor fuel and mazut.

In keeping with our long-range plans, 85 percent of all intermediate H.P. diesel engines to be manufactured in 1985 will use heavy types of fuel.

It is necessary for the RSFSR Ministry of the River Fleet, in conjunction with other governmental departments, to see to the carrying out of complex work programs aimed at resolving problems connected with the use of new types of fuel in ship diesel engines. With increased fuel viscosity, the system for preparing the fuel is more complicated and the operational and thermotechnical characteristics of diesel engines are decreased. In connection with this as well as in consideration of the relatively small horsepower of river fleet vessel main diesel engines, it might be expedient to limit heavy fuels used by the river fleet to those with a viscosity of no higher than 36 centistoke.

It has been noted that utilization of motor fuel by steamship lines of the Volga Basin is being held back by the unsatisfactory delivery of this fuel to diesel motor ships. This is caused by an insufficient number of bunkering facilities and fuel delivery irregularity.

Shifting 6CHNR36/45 diesel engines to motor fuel has yielded a higher labor intensity of about 60 percent (450 man hours per 1,000 hours of operation) in the engines' technical servicing. This increase in labor intensity is caused mainly by the need to clean filters and burners more frequently as well as by an increase in time spent on servicing separators.

Diesel engines of that size using motor fuel cannot operate for a long time under full load. These shortcomings of the 6CHNR36/45 diesels are well known by their designers. Measures for the elimination of these shortcomings are already being taken at the "Dvigatel' Revolyutsii" Plant.

The small amount of operating time of foreign-made diesels under controlled operating conditions does not allow us as yet to evaluate their work.

Of decisive significance in the normal operation of shipboard power units is the system used to prepare motor fuel, a system designed to rid the fuel of water and mechanical impurities and to provide the required viscosity as well.

Ship fuel preparation systems, depending upon the type of equipment installed on heavy fuel cleaning lines, are divided into three types: a settling tank and centrifugal separator; a centrifugal separator without a settling tank; a settling tank and filtration unit.

To the first type belong the systems used aboard diesel motor ships of the "Volga-Don" type (design number 507B), of the "Baltiyskiy" type (design number 613), of the "Bakhtemir" type (design number 326), and of the "Leninskiy Komsomol" type (design number 488A). The principal cleansing means is a centrifugal separator; before entering the separator, the motor fuel is located in the settling tank that serves as the first cleaning stage. As the tests conducted aboard one of the number 326 design diesel motor ships demonstrated, the system was 50 percent effective in clearing mechanical impurities from the motor fuel. As a result of separation, the initial water content (2.2 percent) was lowered to 0.15 percent. In such a manner, the separator facilitates the necessary cleaning of fuel with the minimum expenditure of time spent in its servicing.

To the second type belong the systems used aboard the "Vladimir Il'ich" (design number 301) and "Valerian Kuybyshev" (design number 96-016) passenger diesel motor ships. Preparation of motor fuel aboard those ships proceeds in accordance with the following plan: basic reserve-overflow tank-preheater-separator-preheater-separator-service tank. Installed aboard ships of the "Vladimir Il'ich" type are electric preheaters from the "Zotse" Firm while steam preheaters of the "Laval" Firm have been placed aboard diesel motor ships of the "Valerian Kuybyshev" type. Tests have confirmed that both one and the other are sufficiently effective in operation.

A third type of fuel preparation system is being used aboard icebreakers of the "Kapitan Chechkin" series (design number 1105). Its distinctive feature is a viscosity meter and filtration unit. Its plan for the cleaning of motor fuel is different from the regular system in that, after settling, the fuel is not sent into a centrifugal separator but into a filtration unit which is designed to rid it of water and mechanical impurities.

As shown by tests, the "Boll" Firm unit provides high-quality cleansing from mechanical impurities (up to 10 μ m) but relatively poor water separation (50 percent). However, there is practically no loss of fuel in the filtration unit while there is a 2-3 percent loss in systems using separators.

Diesel motor ships of design numbers 326, 488A, and 613 have been equipped with fuel supply systems of the regular type, systems which are simpler, more reliable and cheaper than individual or combined systems, inasmuch as they consist of less equipment. All of the systems listed facilitate a reliable transition from diesel to motor fuel, are easy to service, and are sufficiently reliable in operation.

Systems of an individual type, developed by the chief designer division of the "Dvigatel' Revolyutsii" Plant, are being used aboard diesel motor ships of the "Volga-Don" and "Valerian Kuybyshev" type. They facilitate long-range management of the transition from one type of fuel to another, the automatic regulation of fuel pressure and temperature, control over basic parameters and the protection of engines from inadmissible deviations from the norm.

However, as tests have demonstrated, pneumatic valve units which serve in the transition from one type of fuel to another are unreliable, complex, and awkward to operate. Because of this, the unit was replaced with a fuel distributor. An operational check of this modernized system aboard the "Volga-Don 187" diesel motor ship demonstrated its increased reliability.

A combined system for the transmission of fuel is being used aboard icebreakers of design number 1105.

On the basis of its research into and tests of various systems of fuel preparation, the Leningrad Institute of Water Transport has recommended two technological plans, from which a selection should be made, depending upon the availability of equipment for the particular technological plan selected.

The Marx 204 automated separator made by the "Laval" Firm and the MK2 filtration unit made by the "Sofranc" Firm are recommended.

The system operates in such a manner that the motor fuel, which contains up to 3 percent water, is first allowed to settle in a tank before being cleaned in a filtration unit. Diesel fuel undergoes cleaning in a centrifugal separator.

As test results have demonstrated, the filtration unit of the "Sofranc" Firm operates normally with a water content of up to 3 percent in the motor fuel and achieves a decrease in the amount of water down to 0.5 percent and less.

When the motor fuel's water content is more than 3 percent, the fuel is placed first in a settling tank and then into a centrifugal separator installed on the diesel fuel line. The fuel is thus converted and brought into the work cycle with a productivity which is close to normal. Then, the fuel is sent to a filtration unit where it is heated and completely cleared of water and mechanical impurities.

The effectiveness of the use of motor fuel is characterized by specific economic indicators in the ship's working during navigation.

Results of the operation of dry-cargo diesel motor vessels of the "Volga-Don" SZRP and VORP types which use motor and diesel fuels attest to the savings effected through the use of motor fuel. Operational expenditures for diesel motor ships using motor oil were 12 percent lower than for vessels of the same design using diesel fuel. Specific expenditures for fuel and for their operation as a whole (kopecks per 1,000 ton-km), without including amortization, for vessels of the first group were lower than for the second group by 40.8 and 25.8 percent, respectively.

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OCEAN AND RIVER

CASPIAN FERRY PROPOSED AT MAKHACHKALA

Moscow VODNYI TRANSPORT in Russian 4 Aug 81 p 2

[O. Omarov, engineer, RSFSR distinguished efficiency expert: "A Ferry Is Needed"]

[Text] The ferry crossing between Baku and Krasnovodsk is an economically important link connecting the Transcaucasus with Central Asia. But at present it is unable to handle the growing flow of cargo and has actually begun to tie up a large amount of railroad rolling stock. Dozens of refrigerated trucks, buses and other trucks are lined up outside the terminal waiting in line for the ferry. This kind of situation became chronic long ago.

The limited traffic capacity of the Baku--Krasnovodsk ferry is backing up entire freight trains where the North Caucasus railroad joins the Azerbaijan railroad. R. Sutayev, chief of the Makhachkala railroad division, says that freight trains traveling south on schedule make lengthy stops on the approaches to Derbent, which is the junction station, and the entire benefit of their rapid travel is lost. Every day there are 10-15 "dropped" trains in this section.

According to the figures of the Makhachkala railroad division, in 1979 1,213 trains were held up here, but in 1980 the figure grew sevenfold and amounts to more than 4 million car-hours. Moreover, military trains which are held up at intermediate stations and on sidings waiting for clearance to the Azerbaijan railroad are not guarded. For the same reason the situation is especially disturbing concerning the preservation of motor vehicles and agricultural equipment.

Is it possible that there is no way out of such a serious situation? The USSR Ministry of Railways, for example, is rerouting an enormous number of cars and sending them to Central Asia around the Northern Caspian, a route which is 2-3-fold longer.

If we take into account that millions of tons of freight for the national economy are annually delivered over those routes, then it is not difficult to calculate what this kind of shipment is costing the state.

An analysis of the operation of the sea ferry over the past 5-year period shows that goods coming from the north through Makhachkala comprise over 80 percent of the volume of freight. Why, then, not give them an outlet to the sea through that port, which is 375 km closer to the consignees of the freight? The whole trouble is that there is no ferry slip at Makhachkala, and opponents of building one present a number of arguments which do not withstand criticism.

According to the calculations of specialists of Kasporniiprojekt, a scientific research and project planning institute, the construction cost of ferry facilities at Makhachkala including erection of enclosing structures, extension of rail lines and other operations would be repaid in 1 year solely on the basis of shipments to the port of Aktau, while delivery of freight to Krasnovodsk and Bekdash would repay the cost in less than 3 months. A large economic benefit is expected from speeding up the turnover of railroad cars now being sent around the Northern Caspian.

The existence of such a ferry would make it possible to deliver goods to consignees by the shortest route and without loss, would minimize the present strain on the Makhachkala--Baku section of track, and would increase the traffic capacity of the North Caucasus railroad. It would seem that the time has come to begin the construction of ferry facilities at Makhachkala.

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OCEAN AND RIVER

NUCLEAR ICEBREAKER 'ROSSIYA' DESCRIBED

Moscow VODNYI TRANSPORT in Russian 6 Jun 81 p 4

[Article by Yu. Stvolinskiy: "The Nuclear-Powered Vessel 'Rossiya'"]

[Text] The bottom sections of the hull of the new nuclear-powered icebreaker "Rossiya" are being fabricated at full speed at the Baltic Shipyard in Leningrad.

Externally the new nuclear vessel much resembles the "Arktika," but actually this will be a qualitatively new vessel. I am looking at the drawings of the "Rossiya"--dozens of drawings representing its separate spaces.

Here is a swimming pool filled with blue water: The tiles sparkle under the rays of artificial sunlight, there are beach chairs as on the beaches of Sochi and Yalta, and behind a door there is a sauna.

"We are striving for the swimming pool to become like a second wardroom on the icebreaker," the designers explain. They want to make their creation more comfortable for the crew, to improve its living conditions. After all, this is very important. One cannot help but recalling the words we once heard uttered by the captain of the "Arktika" Yu. Kuchiyev, Hero of Socialist Labor: "An icebreaking trip consists of monotony, cold, shuddering and vibration, and that goes on for months." True, it is not easy for the crew of an icebreaker. That is why the artists, the naval architects and designers, are seeking optimum solutions in laying out the ship's spaces and in finishing them.

More drawings: the crew's messroom, the wardroom, the recreation room, a comfortable movie theater, a library, separate cabins and the sick bay.

The engineering plan of the "Arktika" was completed just a bit more than 10 years ago. Nevertheless, the present nuclear vessel will meet the needs of the time up to the end of the century. Yet over those 10 years the industries supplying equipment for the second and third nuclear-powered vessels have moved on to new prototypes. Approximately 500 machines and instruments will be new designs. And even though the hull could as a practical matter be built from the old drawings, the designers have made considerable adjustments in locating the many pieces of equipment and they have worked out new routes for main utility lines and have redone the layout of the superstructure. By distributing the pieces of machinery

differently the engineers are trying to improve the conditions for attending them and to facilitate access to them.

Before it departed for the pole, one of the screws of the "Arktika" was equipped with sensors that revealed the pattern of processes taking place when the screw strikes the ice under actual rather than experimental conditions. On the basis of the results of the research which was done, on the "Rossiya" the geometry of the edge of the propeller blade has been changed so that the blows against the ice--which cannot be avoided--will be softer. Designs have also been worked out which will improve the vessel's ice characteristics.

Retaining the principles of the automatic control system, the designers have completely renewed the apparatus, and are using more refined instruments. The volume of information reaching the captain's bridge will increase correspondingly, which will make it possible to take the optimum decisions in a given situation.

There is another very important circumstance. Some of the cabins located in the hull will be moved to the superstructure, where there is less noise and the vibration is not so strong. The length of the superstructure will be increased correspondingly. Along with the new towerlike mast, this will change somewhat the vessel's silhouette. There will also be two half-length masts--bow and stern. What are they for? Since the amount of radio apparatus will increase, the numerous antennas will be placed about differently, and the half-length masts will make it possible to avoid mutual radio interference. Transmissions from the television satellite will be received on the half-length bow mast, a television set is being put in every cabin of the "Rossiya." It is not hard to understand why a man needs this "window on the world" during a prolonged Arctic cruise.

That is what the nuclear-powered vessel "Rossiya" will be like.

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OCEAN AND RIVER

SOVIET CONTAINER SERVICE ON DANUBE RECOUNTED

Moscow VODNYY TRANSPORT in Russian 20 Jun 81 p 2

[Article by V. Kuznetsov, chief of the container shipment division of the Soviet Danube Shipping Line: "Container Service on the Danube"]

[Text] The history of the Danube maritime container service began in August 1975. In 1976 the shipping line, which rented 600 20-foot international-standard containers, started the first line Regensburg--Linz--Izmail--Trabzon--Teheran. Today container service embraces practically all the countries on the Danube. The principal flows of cargo are generated in West Germany, Austria, Hungary, and Czechoslovakia on a regular contract basis. Shipment of containers from Bulgaria and Yugoslavia has begun and is developing. The shipping line's vessels are serving ports in Turkey, Greece, the Near and Middle East, and the Red Sea. Cargo is delivered on a "door-to-door" basis.

Seagoing vessels of the series "Yunyy Partizan" and "Rostok" and also river barges are used on the container routes. In 1980 the fleet of the Soviet Danube Shipping Line received its first self-propelled river vessel, the "Kapitan Antipov." In the 11th Five-Year Plan 10 other motor vessels in this series will be going into service, which will help to considerably increase the intensity and quality of shipment on the Danube.

The shipping line manages its fleet of containers through the European tracking center--the firm Transglobe. Its tasks include managing and monitoring the containers by computer, observing their technical condition and performance of repairs, cost control and other matters. In addition, for the Soviet Danube Shipping Line alone Transglobe performs the operation of processing and forwarding containers to areas of the countries of central Europe, Turkey, Greece, and the Near and Middle East, which makes it possible to provide "door-to-door" delivery of cargo on a through bill of lading.

If we want to show the growth rate of seagoing container traffic on the Danube it is sufficient to say that between 1976 and 1980 it increased nearly 70-fold, and that is still not the limit. In our view, the most important result of the 5 years of experience in container traffic on the Danube is that in spite of the fierce competition from foreign firms, the Soviet Danube Shipping Line has managed to attract sufficiently substantial and stable flows of freight from Hungary, Czechoslovakia, the FRG and Austria.

But this does not diminish the importance of the problems confronting container service today. First of all, these are the qualitative problems, including strengthening the fleet's competitiveness in shipments to the most promising ports of unloading by improving service.

Reduction of cargo delivery time and container turnover time is among the problems of paramount importance. Possible ways of solving this problem are to improve the system for tracing containers and monitoring the fleet of containers using the facility of ASU-"Parakhodstvo" [the computerized management system "Shipping Line"] in combination with similar operations of Transglobe, performing its functions as the general container operator; organization of scheduled express lines with guaranteed delivery times on the most promising routes with stable and sufficiently sizable flows of cargo, where it is feasible to employ the self-propelled river vessels in the series "Kapitan Antipov" and the seagoing vessels in the series "Yunyy Partizan" and "Rostok."

The shipping line, understanding the task that lies ahead in the 11th Five-Year Plan to further raise the level of palletization and containerization of the cargo carried, is today taking every necessary measure to that end. The long-range program for replenishment of the stock of containers calls for containers to be obtained every year from the Il'ichevsk Ship Repair Plant and for leasing them from foreign manufacturers.

The problem of container repairs and of keeping them in normal physical condition will be solved during the current year in the shipping company by acquiring a mobile repair shop, which has already been purchased in Japan. The port already has an auxiliary space, and repair specialists are being trained.

The rear area of the container terminal is being expanded, but there is a need in the very near future to surface the grounds of the container terminal, which would make it possible to use truck container carriers used in the rear.

There is also a need to acquire and install in the port of Izmail special high-capacity container conveyors of the KONE type.

The Basic Directions..state: "Speed up development of the container transport system, expand the shipment of packaged cargo by the pallet-container method and increase the network of special points equipped with equipment for processing containers and pallets." This has become the basic principle in our effort to further develop container service on the Danube and has been determining our plans and future prospects. For instance, vessels in the series "Yunyy Partizan" began in March the experimental hauling of 800 tons of cotton from Izmir and Mersin to Budapest on order for the firm Hungarotex.

The shipping line plans in the future to develop the volume of container cargo and to seek out new cargo and new routes for this operation.

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OCEAN AND RIVER

EXPANSION UNDER WAY IN KRASNOYARSK PORT

Moscow VODNYI TRANSPORT in Russian 28 Jul 81 p 2

[Article by A. Lovchenko, chief of the capital construction division of the Yenisey Shipping Line: "A Port Is Being Built on the Yenisey"]

[Text] The principal riverports on the Yenisey--Krasnoyarsk and Lesosibirsk--are the principal transshipment points from rail to water transport. Every day they handle tens of millions of tons of cargo for the national economy, supplying everything needed for a year in the life and work of the Noril'sk Mining and Metallurgical Combine, settlements above the Arctic Circle and in Arctic regions, as well as enterprises in the timber industry, very large construction projects, and geological prospecting teams. In addition, the collectives of the ports do a considerable amount of work in digging a mixture of sand and gravel, in handling it and in shipping it to numerous consumers.

The collectives of the ports have labored for a long time under rather problematical conditions, and they have coped with the plan and assignments under a great strain. It is not just that the port workers must in the short northern navigation season ship out more than 20 million tons of cargo on vessels and process thousands of railroad cars. There are substantial difficulties because the operating capacities of the ports of Krasnoyarsk and Lesosibirsk have been exhausted and the potential for their development has been entirely utilized.

An acute need has thus arisen for building a new cargo-handling area in the port of Krasnoyarsk--Peschanka. Its construction was envisaged by the decree of the CPSU Central Committee and USSR Council of Ministers entitled "On Measures To Develop River Transportation in the Period 1981-1985," and the Noril'sk Mining and Metallurgical Combine has had an active part in that construction. It is from Peschanka that many cargo loads of equipment will go to areas above the Arctic Circle, and it will then receive the output of enterprises in the Noril'sk industrial region and scrap metal. In view of its capabilities and the volume of cargo handled at Peschanka, it amounts to a new riverport on this Siberian river.

Construction workers of the trust Krasnoyarsktransstroy arrived at the beginning of 1979 on the left bank of the Yenisey not far from Krasnoyarsk. They began to build the docks for receiving and shipping the scrap metal arriving from the port of Dudinka. Its separate project plan was prepared in the institute Lengipromrechtrans. The point is that for many years there has been no place to store the

scrap metal reaching the port of Krasnoyarsk. It was unloaded on the island, and it cluttered up the grounds of the cargo-handling area on the Yenisey. Now it has become possible to take care of this valuable raw material and to ship it more punctually to its consumers.

It must be said that the builders took their assignment seriously. They built the docks for scrap metal with a running length of 107 meters. Last September it was put into operation. Now up to 100,000 tons of scrap metal can be received and handled in Peschanka.

The next thing is to build the entire cargo-handling area of Peschanka. The institute Lengiprorchtrans has prepared the engineering plan; it has been approved by the Ministry of River Fleet and has been sent to Gosstroy for approval.

What will the new port on the Siberian river be like?

More than 10 hectares of land have been assigned to it. This area is supposed to take four docks with a total length of 409 meters. There will be a block of employee facilities, an administration building, repair and machine shops, a fire station, open storage areas, thoroughfares with reinforced-concrete paving, railroad spur tracks, and also a recreation area with playing fields. The docks are equipped with seven 10-ton portal cranes and one 32-ton overhead traveling crane. The total cargo volume of the docks is 642,000 tons. This cargo consists of building materials, reinforced-concrete products, scrap metal, sulfur in containers, trucks and equipment. In the period between navigation seasons freight will be handled for organizations in Krasnoyarsk which do not have their own rail sidings, and sand and gravel mix will be transshipped. Thus in all, this area of the port will handle 1,246,000 tons of freight and cargo for the economy.

The first phase of the Peschanka cargo-handling area, which includes 100 meters of quay, employee facilities, an administrative building, a fire station, roads and rail sidings and other structures, is to go into operation in 1985. The work involved requires nearly 10 million rubles of capital investments. Construction is to begin next year.

But a number of problems have arisen today, and their solution has been slow in coming. First of all, the commission of experts of Gosstroy has still not approved the engineering plan. To be sure, we have been allowed to prepare the working drawings concurrently. But the institute Lengiprorchtrans has still not delivered them to the Yenisey Shipping Line. Because of the lack of working drawings the trust Krasnoyarsktransstroy refused to include in its 1982 plan work items amounting to 700,000 rubles that had been envisaged. But if the institute speeds up delivery of the working drawings, then the construction workers will undertake to build the cargo-handling area Peschanka on time.

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MISCELLANEOUS

PARTY ROLE IN STRENGTHENING TRANSPORTATION SECTOR DISCUSSED

Moscow PARTIYNAYA ZHIZN' in Russian No 14, Jul 81 (signed to press 7 Jul 81)
pp 27-35

[Article by K. Simonov, chief of the CPSU Central Committee Transport and Communications Department: "Party Organizations and Comprehensive Solutions to Transportation Problems"]

[Text] The pace of the 11th Five-Year Plan is quickening. This plan is called upon to insure a further improvement in the well-being of the Soviet people on the basis of the steady and forward-moving development of the national economy, the acceleration of scientific and technical progress and the transfer of the economy onto an intensive path of development, the more rational utilization of the country's production potential, every kind of saving of all kinds of resources and improvements in work quality. Each sector faces its own urgent tasks and specific problems.

As was noted at the 26th CPSU Congress, the basic task for transportation is the complete and timely satisfaction of the requirements of the national economy and the population for transportation and improvement in the efficiency and quality of work in the transportation system. The necessary prerequisites are available for the successful resolution of this task and the achievements envisaged by the party. During the years of the 10th Five-Year Plan the material-technical base for all kinds of transportation--railroad, road, air, maritime, river and pipeline--was substantially strengthened. Thus, during that five-year plan, 20 percent more assets than in the 9th Five-Year Plan were used for the development of railroad transportation and the Baykal-Amur Main Railroad, that majestic construction project of the age.

During this time the tonnage of the seagoing fleet increased. Transportation technology was developed and introduced for carrying freight to remote regions in the western sector of the Arctic during the winter. Ships flying the flag of the USSR now visit more than 1,250 ports in 124 countries round the world. The seagoing fleet fulfilled its five-year plan tasks ahead of schedule. The country's river transportation has been reinforced with heavy-tonnage ships, tugs, powerful icebreakers and dual-purpose steam ships (for plying the rivers and the sea). During the five-year plan huge funds were invested in the development of the sector. The river transportation workers increased the amount of national economic freight carried by 23 percent; preferential growth rates were seen in the regions of the eastern basins.

During the last five-year plan billions of rubles of capital investment were used to strengthen general purpose road transportation. The truck inventory was equipped with modern new KamAZ trucks, comfortable buses and light vehicles. Freight turnover in the sector grew by a factor of 1.4. Freight delivery using economically advantageous centralized methods increased almost 20 percent and the utilization of trailer trucks was extended. The rates of highway construction were slightly increased. Most of the kolkhoz and sovkhos farmstead areas in the Ukraine, Belorussia, Moldavia and certain other union republics are now connected with the rayon and oblast centers by hard-surfaced roads.

While giving the positive results of the activity of transportation during the last five-year plan their proper due, it is also necessary to note that during this period it was not possible to overcome a number of substantial shortcomings and bottlenecks found in the operations of railroad, water and road transportation systems. The workers in each kind of transportation each have their own problems, great and small. Taking into account the seriousness and scales of the problems prevailing in transportation, at 26th CPSU Congress comrade L.I. Brezhnev pointed to the need to solve them on the basis of a long-term comprehensive program. The development of such a program was envisaged by the "Main Directions in the Economic and Social Development of the USSR 1981-1985 and for the Period through 1990".

Under Unremitting Party Control

The comprehensive approach to the solution of the urgent problems of transportation in light of the 26th CPSU Congress instructions obliges us to raise the level of organizational-party and political-educational work in this very important sector of the national economy. It is a question of strengthening this work and taking it under party control and directing it, pivotlike, at insuring a radical improvement in the activity of the entire transportation system. Using all the means available to the communists in exerting party influence, it is necessary to draw up and introduce such measures as would make it possible to utilize the latest scientific and technical achievements to intensify the development and improvement of the country's transportation system and create for transportation workers the most favorable conditions for efficient, high-quality work and healthy leisure.

In accordance with the instructions of the CPSU Central Committee, the central committees of the union republic communist parties and the party kraykoms, obkoms, okruzhkoms, gorkoms and raykoms are called upon to inquire more deeply into the activity of the primary party organizations in transportation and strive to achieve a constant raising of their combat spirit; for it is on the activity and fighting spirit of the party organizations that the implementation of the steps envisaged for the further development and improvement of transportation and the improved coordination and interaction of all the different kinds of transportation largely depend. It is important that the party organizations display daily concern for the mass nature and efficacy of socialist competition and that they approach in an entirely principled way the evaluation of fulfillment by communists of their service and public obligations, and struggle decisively against mismanagement and for high reliability in the operation of transportation and the effective use of rolling stock.

The party committees of Moscow, Leningrad, Kiev, Riga, Odesskaya, Tselinogradskaya and other oblasts have done much in this regard. They are distinguished by their purposefulness, their ability to concentrate the attention of the primary party organizations on the main directions, their concern with enhancing the vanguard role of communists in work collectives. And the results are there to be seen. For example, the Moscow, Odessa, Pribaltic and some other railroads are consistently fulfilling their freight plans. Here the communists take energetic steps to reduce the time that cars are left idle during unloading operations, make rational use of their freight-carrying capacity, accelerate the movement of trains, and organize precise and productive work at the marshalling yards.

However, by no means all party organizations in the railroad system are working in the way they are required to by the decisions of the 26th CPSU Congress and the decree adopted by the CPSU Central Committee "On Measures to Improve Party-Political Work in Railroad Transportation." And this cannot but be a cause for concern to us, for more than half of all the freight moved in the country goes by railroad.

We should also bear in mind the fact that during the present five-year plan the appropriations for railroad development are being increased more than 30 percent. In the decree referred to above, which is of an all-party nature and therefore applicable equally to other forms of transportation, it is clearly stated what must be done to raise the level of party leadership in the enterprises of transportation of all kinds, reinforce party influence on the development of this vitally important sector of the national economy, and eliminate more rapidly the shortcomings and errors that still exist.

We cannot be reconciled to the fact that individual party committees are building up their activity slowly in response to the decisions of the 26th CPSU Congress and party and government decrees, or that in some places they have even lessened their demandingness toward economic leaders and specialists for the education of people, the organization of socialist competition, the introduction of leading experience and the creation of proper work and everyday conditions for the transportation workers. The direct consequences of these shortcomings are a weakening of labor and technologic discipline in some collectives, increased staff turnover, and less feeling of responsibility for the content and utilization of the means of transportation. Thus, already for a long time the collectives of the railroad stations in Achinsk, Dema, Saratov-II, Baladzhary, Khabarovsk, Anisovka, Orsk and others have been underfulfilling plans. And where, then, are the local party organizations? Unfortunately, practice shows that in some cases their efforts are devoted mainly to speechifying and drawing up recommendations of all kinds that frequently add nothing to decisions they have already taken.

At a meeting of the communists of the administration of the Far East Railroad, it was said that they had been drowning in a maelstrom of paper and numerous measures, some apropos and some not. This ruins everything, they complained, and takes up much time without an opportunity to think about how to improve a situation, and--most important of all--do something about it. We do have program documents--the decisions of the CPSU Central Committee, the orders of the minister and the railroad chiefs. They must be precisely fulfilled, completely and in good time; and then the work will improve.

It is difficult not to agree when the question is posed in this way. It is essential to move more rapidly from words to deeds and not to lose sight of the final results of the activity of transportation--results that are measured not by the number of decisions that have been made but by the number of tons of national economic freight that have been delivered to consumers. It is essential to oppose the attempts that are sometimes made to replace the live, creative work with the compilation of countless measures that are not reinforced with effective organizational work, efficient control and checking on the implementation of what might otherwise remain just good intentions. Comrade L.I. Brezhnev points out that "It is not the amount of paper and not the number of meetings or how long they last, but precise political direction, a businesslike approach and the practical results, that are the criteria that can and should be used when evaluating public work."

We should firmly get into the habit of making sure that the level of party leadership is today determined by having an exact idea of the state of affairs at the local level, depth of analysis and generalization, and the ability to provide concrete help and insure the propagation of the best experience of the primary party organizations and the labor collectives.

The CPSU Central Committee attaches special significance to the activity of the party committees at railroad junctions. The operations of entire sections depend directly on efficient work at the junctions. About 40 percent of the time involved in the turnaround of freight cars is accounted for at servicing depots. It is here that the rolling stock is assembled and disassembled and that the foundation is laid for the successful fulfillment of the movements schedule; almost the entire volume of rolling-stock maintenance is carried out here.

This all determines the great role and responsibility of the party committees at the railroad junctions. They now unite more than 140,000 communists--almost one-third of the CPSU members working on the country's railroads. The number of junction party committees is increasing with each passing year. At the center of their activities stand questions of insuring the efficient interaction of all the services involved in the transportation process, primarily the stations, locomotive and freight car depots, track and communications, and the energy sections. Practice has evolved many effective forms for such interaction. They include the setting up of unified junction shifts and the organization of socialist competition between them, and joint analysis of production activity. They include also the two-way transmission of leading experience and carrying out general junction political, cultural and other measures aimed at making all subsections act as a single, cohesive collective to which departmentalism and parochialism are alien.

At the same time we note that not all party committees are exerting the necessary influence on improving the operation of the railroad junctions. Some of them inquire superficially into the daily activity of enterprises, do not occupy themselves with the selection and training of staff, allow frequent replacement of the economic managers, and do not fully use the right afforded them in controlling the activity of the administration.

Transportation is a unified national economic complex whose significance is increasing immeasurably along with the growth in the scales of our economy. By connecting the extracting industry with the processing industry, agriculture with industry, and the producers of goods with the consumers, transportation is called upon to insure the efficient and uninterrupted supply and interaction of all parts of the economic mechanism.

An important role in this is assigned to the transportation ministries--the headquarters where the plans for the transportation of freight and passengers are drawn up. The efficiency of operations in the transportation complex depends largely on how these plans are worked out and implemented, and on how control over their fulfillment is effected. Proceeding from this, the CPSU Central Committee has repeatedly emphasized the need to improve the activity of the party organizations in ministries and administrations. It should be noted that the party committees of the transportation ministries are carrying out much multiform organizational and party-political work to mobilize the workers of the ministry apparatuses to implement the decisions of the 26th CPSU Congress and the instructions of the CPSU Central Committee.

Can it be said, however, that the party organizations of the transportation ministries are organizing their work strictly in accordance with the requirements of the CPSU Central Committee? Unfortunately, this cannot yet be said. There are serious shortcomings in their activity. They are not making full use of the right afforded them in controlling the work of the apparatus in fulfilling party and government directives and sometimes they are found wanting in the proper demandingness made of staff for absolute observance of party and government discipline. The communists are rarely heard at the party meetings of the ministries, administrations and sections reporting that they have fulfilled their service obligations and the requirements of the CPSU statutes. The party committees by no means always examine the criticisms leveled at the ministry apparatus by the local party and soviet organs and also by the press.

Meanwhile, some managers and leading specialists, as before, waste much of their time at meetings and engaged in various kinds of paperwork and are virtually isolated from the enterprises. In other words, vital organizational activity is replaced by bureaucratic methods. Last year the RSFSR Ministry of Motor Transport passed on to the local level about 90,000 documents of various kinds; the Ministry of the Maritime Fleet passed 212,000, and the Ministry of Railways more than 1 million! And all these orders, directives and instructions have to be read. And not just read. They must be responded to in the appropriate fashion and measures drawn up. Where, we must ask, can the economic managers find the time at the local level for vital, creative work?

When they visit the enterprises of their sector, individual leading workers, including deputy ministers, collegium members and administration chiefs, do not always offer concrete aid in overcoming the difficulties encountered or in solving overdue questions. And at meetings of ministry party committees and party sessions of the apparatus the communists are frequently silent on this matter. All attention is sometimes concentrated on the successes that have been achieved. Criticism is frequently of an impersonal and unspecific nature and as a rule aimed at subordinate organizations. Say, for example, that there are isolated shortcomings in the operation of ports, where ships are sometimes idle for periods that exceed the norms while waiting to be loaded or unloaded. This naturally reduces efficiency in the utilization of the fleet and leads to considerable losses. However, for a long time the party committee of the Ministry of the Maritime Fleet did not examine the work of the apparatus in this important matter.

This also happens. A matter is raised in good time during the discussions of the party committee in a given ministry and it appears that a specific and correct decision is reached; but later nothing happens. For example, the party committee of the Ministry of Railways examined the question "On the Course of Fulfillment of the CPSU Central Committee and USSR Council of Ministers Decree on Delivering the Most Important National Economic Freight and Raising the Vanguard Role of the Communists in the Main Administration for Freight in Strengthening Transportation Discipline." In the decision of the party committee, the communists of the main administration were obliged to take the necessary steps to insure the complete satisfaction of national economic requirements for the transportation of timber, coal, ores and mineral fertilizers. But little change for the better was seen. The party committee should have showed more concern for the true efficacy of its resolution and its fulfillment. But it did not display sufficient demandingness and it reconciled itself to the existing situation. Let us note that the party committee in this ministry makes poor use of its right to control the work of the apparatus in fulfilling party and government directives, does not always react in a principled way to shortcomings in the management of the sector, and does not make the necessary party assessment.

One important condition for the success of party leadership is a Leninist style of work. To remember this, and every day and in everything to be guided by Leninist norms is the direct duty of any party leader. Comrade L.I. Brezhnev states: "Unfortunately, even now the simple truth has not been assimilated that the art of leadership does not consist of propagating and lavishing directive instructions about. Having taken a decision, it is necessary to achieve its absolute fulfillment within the time period set. The reinforcement of control must help this. And this control should be effected systematically and operationally, simultaneously from top to bottom."

In accordance with the directives of the 26th CPSU Congress the party committees of the transportation ministries must in a very short time take effective steps to strengthen organizational-party work. It is essential to raise the level of preparation for and holding of party meetings and sessions of the party committees, constantly develop criticism and self-criticism, devise a system for unremitting control over the fulfillment of party and government directives, and regularly inform communists about the course of their realization. Only in this way is it possible effectively to promote the fulfillment of decisions that have been made and to implement the comprehensive program aimed at the timely and uninterrupted provision of all kinds of transportation for the national economy and the population.

Following Lenin's behests, our party displays constant concern to strengthen and expand communications with the masses and to have a sensitive and attentive attitude toward the letters and verbal appeals of the workers and to make practical use of them when resolving current and long-term problems, and to improve the activity of party, soviet and economic organizations.

The CPSU Central Committee demands of the central committees of union republic communist parties, the party kraykoms and obkoms, and the party organizations, consistent implementation of Leninist principles when working with workers' letters, regular checks on fulfillment of party decisions on the organization of examinations of letters and verbal appeals from citizens, strict control over measures adopted, and a further improvement in the personal reception of citizens in central and local organs.

It is also necessary to improve the quality of party training, improve economic education for transportation workers, and perfect training in schools of communist labor. It is essential to strive for training to be carried out in a competent way, with the recruitment of qualified specialists and experienced party workers, taking into account the local features and using specific examples. It is necessary in every possible way to promote the publication of books, brochures and movies about transportation and communications workers in our country.

To Make Effective Use of Capacity and Leading Experience in Management

Under the conditions of the eighties special significance is being acquired by a careful, thrifty attitude toward the national property and the ability to manage effectively and skilfully and make rational use of what is available. At the 26th CPSU Congress comrade L.I. Brezhnev noted: "Improvements in the utilization of production capacities--machinery, equipment and the means of transportation--open up great possibilities." These words contain the call of the age. As they apply to transportation, they possess the force of a principled directive, a direct call for action. The capacities available to transportation today make it possible to obtain a much greater return than is actually the case.

Take freight car turnaround. Each day about 20,000 cars remain unloaded at the enterprises, and another 15,000 are standing idle at stations waiting for access track to be cleared. If all stoppages are taken into account it turns out that in the process of operating freight cars, the cars themselves are actually moving only 25 to 30 percent of the time. It has been calculated that if freight car turnaround time could be reduced by just one hour countrywide it would be possible to insure in one year the additional transportation of up to 25 million tons of freight. And the opportunities are available to do this. One example already exists.

The CPSU Central Committee recently adopted a decree "On the Experience of the Work by Collectives at Enterprises of Railroad Transport and Industry in Lvovskaya Oblast in the Efficient Utilization of Freight Cars." The recommendation was made that the Ministry of Railways, with the participation of other interested ministries, should hold conference-seminars for groups of railroads to study this experience, and draw up and confirm methodological instructions to apply it. And of what does this experience consist? Primarily in a definite system of measures to make efficient use of freight cars. It provides for the application of leading methods in loading and unloading work in all the subsections of the railroads and industrial enterprises, substantial reductions in the intervals between operational work, precise information on the dispatch and assembly of freight cars, the implementation of measures to develop and maintain the technical condition of access track and the transportation facilities, the complete utilization of the capacity of freight cars and strict observance of the requirements for maintaining and cleaning them.

The following fact testifies eloquently to the efficacy of the system. In 1980, compared with 1978 losses in loading resources on the access tracks in Lvovskaya Oblast were almost halved, the static loading of freight cars considerably increased, and the growth rates for the use of unit trains during this period was three times greater than the average for the networks. In accordance with

the decision of the CPSU Central Committee, the union republic communist parties and the party kraykoms and obkoms should initiate organizational and political work to disseminate the Lvov experience, direct the efforts of party committees at enterprises and organizations toward undeviating fulfillment of the instructions of the 26th CPSU Congress on reducing delays in transportation, and activate the work of the commissions set up by the party organizations to effect control over the activity of the administration and improve the utilizations of the means of transportation.

The possibilities of the initiative, approved in its time by the CPSU Central Committee, from the collective at the Lyublino Marshalling Yard in the Moscow railroad network for the most efficient use of the means of transportation and raising labor productivity, are still far from exhausted. Moreover, the experience of this collective has not only not lost its significance today but even requires further improvement and dissemination. The fact is that the causes of many serious difficulties along the road of rational utilization of available capacities in railroad transport are to be found simultaneously in the unsatisfactory operations of individual marshalling yards and junctions. The creative initiative of the Lyublino people has now been fully or partially introduced at more than 1,000 stations, and during the past two years has produced savings of more than R10 million.

This would appear to be an impressive figure. But it can and must become much larger. Judge for yourselves. For eight years the collective at the Lyublino Station has been handling freight cars at the rate of one every 4.5 to 4.7 hours, while at other stations this sometimes takes 10 or 12 hours. Reducing idle-time for freight cars at technical stations by only one-tenth of an hour throughout the entire railroad networks makes it possible to make available about 10,000 cars for transportation. Here, the field of activity for the the local party organizations is also extensive. Maximum effort must be made to mobilize the railroad collectives to make use of all reserves in the struggle to reduce idle-time for rolling stock and insure the unhampered dispatch of the cars.

In many directions throughput capacity is virtually fully used. Under these conditions increasing the throughput capacity of the railroads by adding weight and using more cars per train becomes a main reserve. In 1979 the CPSU Central Committee approved the experience of the Moscow Railroad in forming and organizing the movement of heavy trains, and it entrusted the Ministry of Railroads and local party organizations and railroad administrations with the task of taking appropriate steps to disseminate this experience. In the time that has elapsed since then the Oktyabr'skaya, Belorussian, West Siberian and some other railroads have done much to introduce the experience of the Muscovites. Last year (compared with the year before) the average weight of trains increased considerably.

At the same time the Gorkiy, Alma-Ata, Central Asian, Sverdlovsk and South Urals railroads not only did not fulfill the tasks set in 1980 for the average weight of trains but even lowered the indicator. It should be recalled that in its decision, the CPSU Central Committee made it obligatory upon local party organizations to direct the efforts of party, trade union and Komsomol organizations at railroad enterprises to seek out reserves to insure growing volumes of freight transportation. We think that the departments of transportation and communications

in the communist parties of Kazakhstan, Uzbekistan and Turkmeniya, and also the Gorkiy, Sverdlovsk and Chelyabinsk party obkoms will draw the appropriate conclusions and take energetic steps to introduce leading experience in management and make rational use of available capacities.

Attaching great significance to the introduction of leading forms and methods and insuring precise interaction between all kinds of transportation, the CPSU Central Committee has adopted the decree "On the Labor Cooperation of Collectives of Sailors, Railroad Workers, Road Transportation Workers and River Transport Workers in the Leningrad Transportation Junction." The decree approved and recommended the initiative of the Leningraders for broad dissemination. Today, thanks to the efforts of ministries and local party and soviet organizations, this experience in the comprehensive solution of problems at transportation junctions has been applied in 38 sea ports and 76 river ports throughout the country, that is, in virtually all the major water transportation junctions. As a result, it has been precisely in the last three years that, without any kind of additional investments, a savings of more than R20 million has been produced throughout the USSR Ministry of the Maritime Fleet.

Nevertheless, despite the work that has been done to disseminate the valuable experience of the Leningraders, its possibilities are not being fully utilized. Idle-time for ships, freight cars and trucks remains high. Considerably more could be achieved through the further activation of the activities of the commissions to coordinate the work of various kinds of transportation. On the recommendation of the CPSU Central Committee these commissions have been formed in the union republics and krays and oblasts in the krayoblispolkoms. The level of work by many of them deserves approval, but not all. Given appropriate party-political backing they could make a substantial contribution to generalizing and propagandizing valuable leading experience, strengthening the mutual responsibility of subcontractors for the efficient use of the means of transportation and developing comprehensive socialist competition for uninterrupted transportation services for the national economy and the population.

The party is now taking steps to further improve the economic mechanism. The communist parties of the union republics and the party kraykoms and obkoms and their departments of transportation and communications are called upon to improve party-political work to strengthen the mutual responsibility of subcontractors, inquire more deeply into practical activity to coordinate the different kinds of transportation, and generalize and disseminate valuable experience in order to promote the development of the country's entire transportation system. It is expedient, with the participation of the scientific research organizations, to examine the question of the possibility of creating on the basis of each transportation junction a system for the operational management of the industrial transportation complex, recruiting into this system both those dispatching freight and those taking delivery of it.

The joint decree of the CPSU Central Committee and USSR Council of Ministers "On Measures To Develop River Transport in 1981-1985" provided for a substantial increase in the volume of freight moved by river. Special attention was given to river transport in Siberia and the Far East. When effecting control over the realization of the program outlined by the decree, the union republic communist

parties and the party kraykoms and obkoms and their departments of transportation and communications should constantly keep in sight both the activity of the river steamship lines and of the administrations and organizations making use of the services of river transport.

The river transportation workers also have competition in the struggle to implement the party plans for the 11th Five-Year Plan. The collectives of the West Siberian, White Sea--Onega, Moscow and other river steamship lines are working consistently. Their operations are under the constant control of the oblast party committees. And it is not surprising that here good mutual relations have been established between the subcontractors, and with all the clients serviced. In the East Siberian, Yenisey, Irtysh and Kama steamship lines the situation is quite different.

For example, many unfavorable criticisms are caused by the operations of the Osetrovo river port. The main reason for this is the lack of well-organized work by the railroad and river transportation workers in this transport junction. Despite the fact that the shortcomings in the operational activity of the port of Osetrovo have been apparent for a long time, the leaders of the East Siberian Railroad and the Lena Unified Steamship Line have not taken the steps needed to bring order to the handling of freight coming into the port. The Irkutsk party obkom and its department of transportation and communications should reinforce control over the work of the oblast's largest transportation enterprise. The situation in the Volgograd and Kambarka river ports is similar.

Motor transportation is being called upon to play an increasing role in insuring a smooth rhythm in the delivery of national economic freight to delivery points and in transporting passengers. It is now intended to implement a complex of measures to expand centralized transportation by general purpose motor transportation between major cities and industrial centers and to use trailer trucks with large freight capacities carrying freight in both directions. For this it is proposed to reduce the number of departmental vehicles on the highways, cut back on the number of empty runs, and eliminate irrational transportation of freight on especially heavily trafficked sections of the railroad. The necessary work has become more purposeful in a number of krays and oblasts. The level of regular intercity trips made by the motor transportation ministries has risen substantially. The volume of small-part freight and container transport switched from the railroads has also increased slightly. Countrywide, the reserves here are extremely substantial. As before, tens of thousands of trucks belonging to the various ministries and administrations cruise along the main highways with no consideration for economic expediency. Empty runs, for which about 2 million tons of expensive automotive fuel are used each year, are being cut back slowly.

The union republic ministries of motor transport do little to study freight flows and are developing at inadequate rates the network of wayside trucking stations to group together small-part loads for onward dispatch to the intercity highways. Transportation using the system of hauling stages on routes [tyagovyye plecha] with an agreed schedule is being extended slowly. And it is a fact that this makes it possible to reduce by 15 to 20 percent vehicle idle-time during loading operations and to reduce the time taken to deliver freight. At the same time the scales of unorganized freight carrying, where the driver himself makes the decisions

on the road, are increasing. The existing network of control and dispatch points remains small and has little effect on ordering the operation of vehicles on the road.

There are other reserves. Increasing the service life of trucks is of great national economic significance. In this connection, the experience of Moscow's motor transport workers in running their trucks for up to 350,000 kilometers without major overhauls deserves broad support and dissemination. It is also essential to carry out constant work to increase the time of on-line operation of vehicles and to reduce empty runs and the time taken for loading and unloading operations. The most important thing is to learn skillfully and make efficient use of the means of transportation that are already available in the country.

* * * * *

Transportation has always played an important part in the life of the country. Now, under the conditions of the dynamic development of all sectors of the national economy and the heightened development of new economic regions, the significance of transportation is growing even more. Here it should be borne in mind that the resolution of urgent problems in transportation and the overcoming of the shortcomings and difficulties existing here is not only a matter for transportation. As was stressed at the 26th CPSU Congress, it is a great all-state task that cannot be solved in isolation. For example, without the necessary concern for the rapid development of the network of major and local highways and their maintenance and upkeep, motor transport could not effectively fulfill its function.

Unfortunately, the management of the highways is lagging seriously behind the growth of industry and agriculture. For example, studies conducted at 200 kolkhozes and sovkhoses in the RSFSR showed that a large number of tractors are engaged in towing trucks during the season when the roads are bad. Because of the poor road conditions, idle-time for motor transport vehicles is great, and this negatively impacts the work of sovkhoses and kolkhozes.

The party and government have taken a number of steps aimed at increasing the rates of road building. During the present five-year plan the country's road builders will receive considerable material resources. The more extensive use is envisaged of local materials and waste and secondary products from industrial production. Practice confirms that where these matters are under the control of the party organs positive results are achieved. In Krasnoyarskiy Kray, during the last five-year plan more than double the asphalt roads existing at the start of the five-year plan were built. Successes in road building have been achieved in Saratovskaya, Sverdlovskaya, Kokchetavskaya, Donetskaya and other oblasts. This is indisputably thanks to the local party organs.

Today, 28,000 primary party organizations uniting within their ranks 1.1 million communists, are operating within transportation. This is a huge force. The influence of the party on transportation, the scope and efficacy of socialist competition, and the implementation of measures to further develop and improve the operation of the country's transportation system depends on the activity and fighting efficiency of the primary party organizations and the level of leadership for them on the part of the party committees. In their organizational and ideological-educational work the party organizations should depend more on the trade unions and the Komsomol.

It is necessary to enhance the role and responsibility of trade union and Komsomol organizations in solving transportation problems and in raising the initiative and creative activity of the workers and recruiting them into the management of production. Our trade unions are given substantial rights. But in some comrades in the trade union committees the sense of principle and impatience with shortcomings has been dulled in questions of improving the organization of labor and everyday conditions for the transportation workers. It is necessary to raise the activity and fighting spirit of the trade union committees in creating for the labor collectives in transportation the most favorable conditions for fulfilling plans and socialist pledges and for cultural leisure. And this must be done primarily through the communists elected to the trade union organs.

The tasks of the party organizations are complex and multiform. While showing concern to make a worthy contribution to the comprehensive solution of transportation problem, communists should provide an example in everything, this is what promotes the complete and timely satisfaction of the requirements of the national economy and the population for transportation and the precise interaction and coordination of the activity of all forms of transport.

Raising the efficiency and work quality of transportation is a most important factor in the realization of the economic and social tasks set by the 26th CPSU Congress.

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MISCELLANEOUS

GEORGIAN EXPERIENCE, PROSPECTS IN PNEUMATIC TRANSPORT DISCUSSED

Tbilisi KOMUNISTI in Georgian 29 Mar 81 p 2

[Article by Gruzgosvodproyekt Chief Specialist G. Kobulia under rubric "Technical Progress is Required by the Times": "Adopt Pneumatic Transport Widely"]

[Text] The intensive growth of industrial and agricultural output and the rapid pace of construction impose big demands on transport which present facilities cannot handle. And it takes considerable capital investment to build a new railroad network and motor vehicle highways. It is also necessary to keep in mind that the big cities and many of the main routes are so clogged with various kinds of transport that average automotive transport speeds are gradually declining and the cost of haulage is rising.

Add to this the fact that the large amount of automotive transport is polluting the air with exhaust gases. It also causes noise. In addition, the enforcement of traffic safety is becoming more complicated, and the accident rate is rising. It is only logical, therefore, that great importance is attached to finding new, more rational means of transport.

In the CPSU CC's report to the 26th CPSU Congress, Comrade L. I. Brezhnev noted: "Special mention should be made of transport operations. We have considered the seriousness and scale of transport problems and concluded that we can resolve them only on the basis of a long term integrated program. The working out of such a program is stipulated in the Basic Guidelines."

The use of steel pipelines for transporting petroleum, other liquids, and gas has long been familiar.

In the 1960s people in this republic became interested in seeking ways to use pipelines to move bulk and individual freight under air pressure. On the basis of preliminary theoretical computations and research it was determined that this type of transport was possible. Georgia's Gruzgosvodproyekt Institute and Moscow's Transprogres Design Bureau specialists developed a prototype installation for the new type of containerized pneumatic transport, known as Lilo-1.

Movement in the installation was created by air pressure produced by series-manufactured pneumatic pumps.

The design and operating principles of the installation are based on a number of inventions by our specialists; they have been patented in the United States, Great Britain, Canada, West Germany, France, Italy, Japan, Switzerland, and other countries.

The prototype consists of three basic components. They are: A single-strand transport pipeline, a loading station, and an offloading station.

The pipelines, operating with compressed air--known as "pneumatic trains"--are made of steel pipe one meter in diameter. A "pneumatic train" consists of six cylindrical containers and two cars. Graded inert material is poured into the containers which, consequently, function like rail cars. A pneumatic car, however, hooked to the front and back of the train, represents a piston which the air pressure acts upon. The piston completely seals the pipe section and fills its perimeter so tightly that pressure losses are reduced to a minimum.

Each container and pneumatic car are supported on two dollies by small radially placed rubber wheels which move the containers through the pipeline.

The loading station is a zone where the pneumatic train is loaded with inert materials from six special hoppers. Installed on each hopper is a dispenser which determines the exact amount of material to be poured into the containers. This zone is the location of the pneumatic pump installation which maintains the right pressure.

At the offloading station, reception of the train and offloading of the inert material are accomplished by means of pneumatic pump units.

The operation of the installation is automated, run from a central dispatcher control panel.

The installation was built by the GSSR Reclamation and Water Management Ministry. It went into operation in 1971.

Experimental operation confirmed the correctness of the installation's technical design as well as its efficiency and substantial advantages over automotive and rail transport.

It was found that an atmospheric pressure difference of only 0.1 to 0.3 is necessary to move a 25-ton pneumatic train through the pipeline at a speed of 45 km per hour carrying 15 tons of inert material. Hauling freight by this means is two to three times less costly than by automotive transport.

The startup of Lilo-1 evoked a great deal of interest both in our country and abroad.

Since 1971 representatives of a large number of firms and state corporations from America, Europe, Asia, and Australia have visited our republic to inspect the installation. In 1973 the Japanese firm Sumito obtained a license and received the right to build the installation on the basis of an agreement with our country.

Thus, the operation of Lilo-1 demonstrated the practical feasibility of this new kind of transport as well as the great prospects for further use.

The vital state importance of pneumatic transport development was noted in a decree from higher bodies. The decision was made to develop this kind of installation in a number of regions of the USSR--in Georgia, to transport inert material from the Marneuli Rayon quarries to Tbilisi, because the rivers in the Marneuli zone--Debeda and Khrami--provide abundant inert materials. These materials will find extensive use in the future, because the demand for inert materials in the republic is rising. But because the existing transport facilities in Marneuli could not handle increased haulage requirements, it was necessary to build a second rail line or fundamentally rebuild the main highway, both requiring large capital investments. It was decided, therefore, to build a pneumatic transport installation as the most profitable type of transport.

Gruzgosvodproyekt Institute and its corresponding design bureau drafted plans for a Lilo-2 installation, designed to carry inert materials 40 km to Tbilisi from the quarries of Shulaveri and Imiri. Plans call for setting up loading stations in the Shulaveri and Imiri quarries and building offloading stations at Marneuli and Imiri. The main pneumatic line is being constructed out of two steel pipes of 1220 mm diameter. The one will carry loaded trains, the other will carry empties.

Inert materials are to be transported in 24 consists at 6.5 minute intervals. The system can transport two million tons from the quarries annually.

In contrast to Lilo-1, each pneumatic train in the new one is made up of eight containers with a total carrying capacity of 32 tons.

The whole system is automated and run from a central dispatcher control panel.

Construction of Lilo-2 was started in 1975 by the Water Management Ministry. Work on Phase 1, the 17.5-km section between Shulaveri and Marneuli, is completed. Experimental-industrial operation is currently under way.

Inert material is being moved from the Shulaveri quarry to the Marneuli Ferro-concrete Products Plant on a steady basis. Construction is simultaneously under way on Phase 2, the Marneuli-Tbilisi section, which will be completed by the end of this year, making Lilo-2 completely operational. All this has come about thanks to the interest and concern of the GCP CC and the republic's government.

Considering the fact that Lilo-2 is the biggest such installation, first built in our republic, and that it includes completely new types of nonstandard equipment, automation and remote control equipment, and many other devices, and that there is no experience in the maintenance and operation of such an installation anywhere in world engineering practice, it is clear that the operations service is especially important. Therefore, it must be manned with qualified cadres and provided with the appropriate material-technical base.

The operations service has the duty not only of ensuring normal and uninterrupted operation of the installation but also of keeping close watch over particular basic components which will serve as the basis for perfecting future designs.

Lilo-1 and Lilo-2 must be used to test a number of rationalization proposals made by specialists before making final decisions.

For example, institute specialists have submitted a very interesting proposal on how to increase the installation's capacity at comparatively little cost. At present the system calls for a pneumatic train consisting of eight containers, whose carrying capacity is increased by a few tons. But on the basis of operations experience and technical calculations it has been determined that the number of containers in the pneumatic train can be increased to twelve. This will increase the installation's capacity by 1.5 times annually--to three million tons--yet the cost of haulage will be significantly reduced.

The prospects for the use of this new type of transport are bright. As is stated in the "Basic Guidelines of Economic and Social Development of the USSR for 1981-85 and for the Period Through 1990": "We must accelerate the adoption of new, continuous specialized types of transport--conveyor belt, pneumatic-containerized, hydraulic, and others--especially in the mining and chemical industries and enterprises of the building materials industry."

Consequently, it is essential to coordinate the joint and creative efforts of the operations service, the design organizations, the scientific-research institutes, and all others concerned in order to further perfect this installation.

At present we are using our installation to haul inert materials, but it has prospects for broader use. It can be used to haul agricultural products--for example, it can supply livestock and poultry complexes with combination feeds directly from the plants, transport green tea leaves directly from the plantations to the tea factories, and so on.

Pneumatic transport can also be used effectively to move household wastes and trash from the cities. At present, these operations take large numbers of trucks.

Such an installation is already being built in one of Leningrad's rayons; it will soon go into operation.

Consequently, the new means of transport has a very versatile future.

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